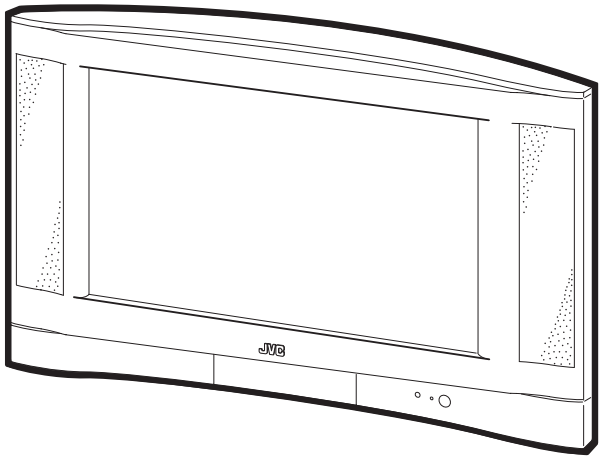
JVC

SERVICE MANUAL

COLOUR TELEVISION

HV-28P37SUE,
HV-28P37SJE

BASIC CHASSIS
MM



InteriArt

D.I.S.T. Digital Image Scaling Technology

Natural Vision

T-V LINK

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No.YA010
2003/12

SPECIFICATION

Item			Content	
			HV-28P37SUE	HV-28P37SJE
Dimensions (W × H × D)			85.4cm × 50.8cm × 49.3cm	
Mass			38.0kg	
TV RF System			CCIR (B/G, I, D/K, L/L')	CCIR (B/G, I, D/K, L)
Colour System			PAL / SECAM / NTSC (Only EXT mode)	
Stereo System			A2 (B/G, D/K), NICAM (B/G, I, D/K, L)	
Teletext System			FLOF (Fastext) TOP (German system) WST(World standard system)	
Receiving Frequency		VHF UHF CATV	47MHz ~ 470MHz 470MHz ~ 862MHz 116MHz ~ 172MHz, 220MHz ~ 469MHz	47MHz ~ 470MHz 470MHz ~ 862MHz ----------
Receiving channels			E2-E12, E21-E69, S1-S41, X, Y, Z, Z+1, Z+2, ITALY (A-H, H+1, H+2), F2-F10, F21-F69, R1-R12, R21-R69	E2-E12, E21-E69, S1-S41, X, Y, Z, Z+1, Z+2, IR A-J, F21-F69
Intermediate Frequency		VIF SIF	38.9MHz (B/G, D/K, I , L), 33.95MHz (L') 33.4MHz (5.5MHz:B/G), 32.9MHz (6.0MHz:I) 32.4MHz (6.5MHz:L, D/K), 40.45MHz (6.5MHz:L')	33.4MHz (5.5MHz:B/G), 32.9MHz (6.0MHz:I) 32.4MHz (6.5MHz:L, D/K),
Colour Sub Carrier Frequency		PAL SECAM NTSC	4.43MHz 4.40625MHz / 4.25MHz 3.58MHz / 4.43MHz	
Power Input			AC220V ~ AC240V, 50Hz	
Power Consumption			127W(Average), 2W(Standby)	
Aerial Input Terminal			75Ω unbalanced, coaxial	
Picture Tube			Visible size : 66cm (Measured diagonally) H : 58.3cm × V : 33.0cm	
High Voltage			31.0kV (+0.2kV / -0.2kV) (at zero beam current, FULL mode)	
Speaker			13cm × 6.5cm, oval type × 2	
Audio Power Output			10W + 10W	
External terminal	EXT-1 (Input/Output)		21 pin Euro connector (SCART socket) • Video input, Audio L/R inputs and RGB inputs are available. • TV broadcast outputs (Video and Audio L/R) are available.	
	EXT-2 (Input/Output)		21 pin Euro connector (SCART socket) • Video input, S-video (Y/C) input, Audio L/R inputs and RGB inputs areavailable. • Video and Audio L/R outputs are available. • T-V LINK functions are available.	
	EXT-3 (Input)		21 pin Euro connector (SCART socket) • Video input, S-Video (Y/C) input and Audio L/R inputs are available.	
	EXT-4 (Input)	COMPONENT VIDEO AUDIO	RCA pin jack × 3 Y : 1V(p-p), Positive (Negative sync provided), 75Ω PB/PR : 0.7V(p-p), 75Ω • Progressive-scanning signals (525p, 625p, 1125i, 1250i) are available. 500mV (rms), High impedance RCA pin jack × 2	
	EXT-5 (Input)	S-VIDEO VIDEO AUDIO	Mini-DIN 4 pin × 1 Y : 1V(p-p), Positive (Negative sync provided), 75Ω C : 0.286V(p-p) (Burst signal), 75Ω 1V(p-p), Positive (Negative sync provided), 75Ω RCA pin jack × 1 500mV(rms), Low impedance, RCA pin jack × 2	
Audio output (Variable)			0~1000mV(rms), Low impedance, RCA pin jack × 2	
Headphone			Stereo mini jack (3.5mm) × 1	
Remote Control Unit			RM-C1800 (AA / R06 dry cell battery × 2)	

Design & specifications are subject to change without notice.

SECTION 1
PRECAUTION

1.1 SAFETY PRECAUTIONS [EXCEPT FOR UK]

(1) The design of this product contains special hardware, many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.

(2) Alterations of the design or circuitry of the products should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.

(3) Many electrical and mechanical parts in the products have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. **Electrical components having such features are identified by shading on the schematics and by (⚠) on the parts list in Service manual**. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list of Service manual may cause shock, fire, or other hazards.

(4) **Don't short between the LIVE side ground and ISOLATED (NEUTRAL) side ground or EARTH side ground when repairing.**
Some model's power circuit is partly different in the GND. The difference of the GND is shown by the LIVE : (⊥) side GND, the ISOLATED (NEUTRAL) : (⏚) side GND and EARTH : (⏚) side GND.
Don't short between the LIVE side GND and ISOLATED (NEUTRAL) side GND or EARTH side GND and never measure the LIVE side GND and ISOLATED (NEUTRAL) side GND or EARTH side GND at the same time with a measuring apparatus (oscilloscope etc.). If above note will not be kept, a fuse or any parts will be broken.

(5) If any repair has been made to the chassis, it is recommended that the B1 setting should be checked or adjusted (See B1 POWER SUPPLY check).

(6) The high voltage applied to the picture tube must conform with that specified in Service manual. Excessive high voltage can cause an increase in X-Ray emission, arcing and possible component damage, therefore operation under excessive high voltage conditions should be kept to a minimum, or should be prevented. If severe arcing occurs, remove the AC power immediately and determine the cause by visual inspection (incorrect installation, cracked or melted high voltage harness, poor soldering, etc.). To maintain the proper minimum level of soft X-Ray emission, components in the high voltage circuitry including the picture tube must be the exact replacements or alternatives approved by the manufacturer of the complete product.

(7) Do not check high voltage by drawing an arc. Use a high voltage meter or a high voltage probe with a VTVM. Discharge the picture tube before attempting meter connection, by connecting a clip lead to the ground frame and connecting the other end of the lead through a 10kΩ 2W resistor to the anode button.

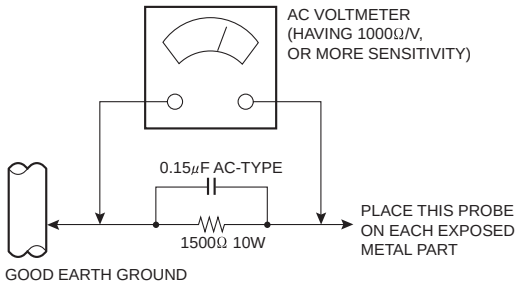
(8) When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage circuit area. Where a short circuit has occurred, those components that indicate evidence of overheating should be replaced. Always use the manufacturer's replacement components.

(9) **Isolation Check (Safety for Electrical Shock Hazard)**
After re-assembling the product, always perform an isolation check on the exposed metal parts of the cabinet (antenna terminals, video/audio input and output terminals, Control knobs, metal cabinet, screw heads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

a) **Dielectric Strength Test**
The isolation between the AC primary circuit and all metal parts exposed to the user, particularly any exposed metal part having a return path to the chassis should withstand a voltage of 3000V AC (r.m.s.) for a period of one second. (. . . Withstand a voltage of 1100V AC (r.m.s.) to an appliance rated up to 120V, and 3000V AC (r.m.s.) to an appliance rated 200V or more, for a period of one second.)
This method of test requires a test equipment not generally found in the service trade.

b) **Leakage Current Check**
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5mA AC (r.m.s.).
However, in tropical area, this must not exceed 0.2mA AC (r.m.s.).

Alternate Check Method
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Use an AC voltmeter having 1000Ω per volt or more sensitivity in the following manner. Connect a 1500Ω 10W resistor paralleled by a 0.15μF AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.). Measure the AC voltage across the resistor with the AC voltmeter. Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75V AC (r.m.s.). This corresponds to 0.5mA AC (r.m.s.).
However, in tropical area, this must not exceed 0.3V AC (r.m.s.). This corresponds to 0.2mA AC (r.m.s.).



1.2 SAFETY PRECAUTIONS [FOR UK]

(1) The design of this product contains special hardware and many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.

(2) Alterations of the design or circuitry of the product should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.

(3) Many electrical and mechanical parts in the product have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessary be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the Parts List of Service Manual. Electrical components having such features are identified by shading on the schematics and by (⚠) on the Parts List in the Service Manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the Parts List of Service Manual may cause shock, fire, or other hazards.

(4) The leads in the products are routed and dressed with ties, clamps, tubing's, barriers and the like to be separated from live parts, high temperature parts, moving parts and / or sharp edges for the prevention of electric shock and fire hazard. When service is required, the original lead routing and dress should be observed, and it should be confirmed that they have been returned to normal, after re-assembling.

WARNING

(1) The equipment has been designed and manufactured to meet international safety standards.
(2) It is the legal responsibility of the repairer to ensure that these safety standards are maintained.
(3) Repairs must be made in accordance with the relevant safety standards.
(4) It is essential that safety critical components are replaced by approved parts.
(5) If mains voltage selector is provided, check setting for local voltage.

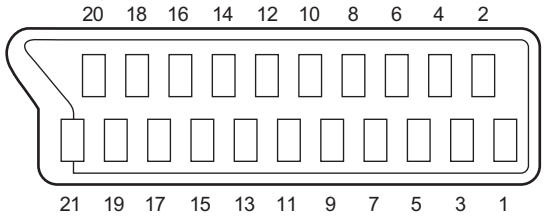
SECTION 2
SPECIFIC SERVICE INSTRUCTIONS

2.1 21-pin Euro connector (SCART) : EXT-1/EXT-2/EXT-3

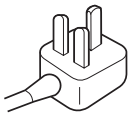
Pin No.	Signal designation	Matching value	EXT-1	EXT-2	EXT-3
1	AUDIO R output	500mV(rms) (Nominal), Low impedance	Used (TV OUT)	Used (LINE OUT)	Not used
2	AUDIO R input	500mV(rms) (Nominal), High impedance	Used (R1)	Used (R2)	Used (R3)
3	AUDIO L output	500mV(rms) (Nominal), Low impedance	Used (TV OUT)	Used (LINE OUT)	Not used
4	AUDIO GND		Used	Used	Used
5	GND (B)		Used	Used	Used
6	AUDIO L input	500mV(rms) (Nominal), High impedance	Used (L1)	Used (L2)	Used (L3)
7	B input	$700mV_{(B-W)}$, 75Ω	Used	Used	Not used
8	FUNCTION SW (SLOW SW)	Low : 0V-3V High : 8V-12V, High impedance	Used	Used	Used
9	GND (G)		Used	Used	Used
10	SCL / T-V LINK		Not used	Used (SCL2 / TV-LINK)	Not used
11	G input	$700mV_{(B-W)}$, 75Ω	Used	Used	Not used
12	SDA		Not used	Used (SDA2)	Not used
13	GND (R)		Used	Used	Used
14	GND (YS)		Used	Not used	Not used
15	R / C input	R : $700mV_{(B-W)}$, 75Ω C : $300mV_{(P-P)}$, 75Ω	Used (R)	Used (C2/R)	Used (C3)
16	Ys input (FAST SW)	Low : 0V-0.4V, High : 1V-3V, 75Ω	Used	Used	Not used
17	GND (VIDEO output)		Used	Used	Used
18	GND (VIDEO input)		Used	Used	Used
19	VIDEO output	$1V_{(P-P)}$ (Negative sync), 75Ω	Used (TV OUT)	Used (LINE OUT)	Not used
20	VIDEO / Y input	$1V_{(P-P)}$ (Negative sync), 75Ω	Used	Used	Used
21	COMMON GND		Used	Used	Used

(P-P= Peak to Peak, B-W= Blanking to white peak)

[Pin assignment]



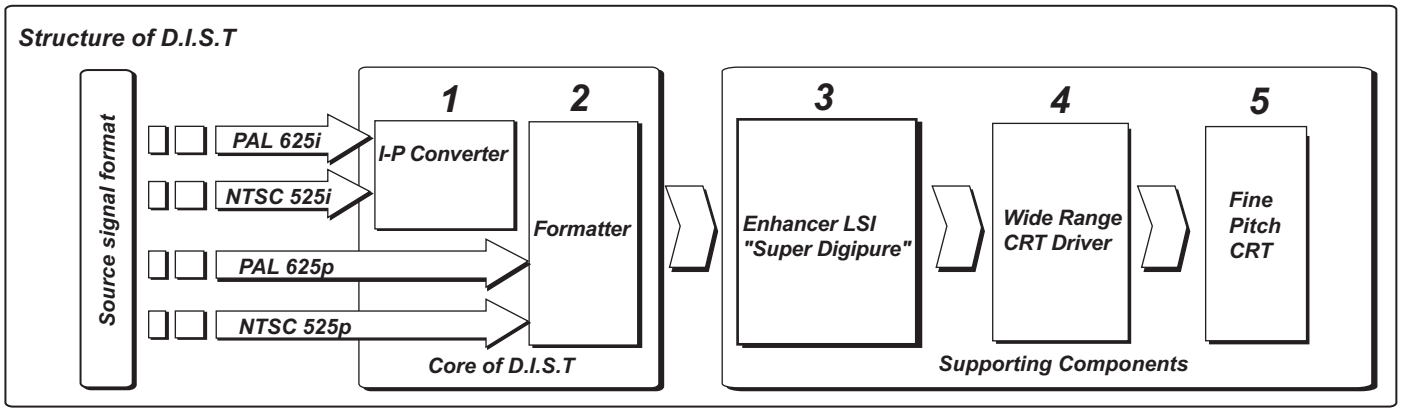
2.2 MAIN DIFFERENCE LIST

Item		Content	
		HV-28P37SUE	HV-28P37SJE
POWER CORD		QMPK160-185JC	QMPK-185-JC 
TV RF System		CCIR (B/G, I, D/K, L/L')	CCIR (B/G, I, D/K, L)
Receiving Frequency	VHF	47MHz ~ 470MHz	←
	UHF	470MHz ~ 862MHz	←
	CATV	116MHz ~ 172MHz, 220MHz ~ 469MHz	---
Receiving channels		E2-E12, E21-E69, S1-S41, X, Y, Z, Z+1, Z+2, ITALY (A-H, H+1, H+2), F2-F10, F21-F69, R1-R12, R21-R69	E2-E12, E21-E69, S1-S41, X, Y, Z, Z+1, Z+2, IR A-J, F21-F69

2.3 FEATURES

ADVANTAGES OF D.I.S.T

D.I.S.T. (Digital Image Scaling Technology) realizes a flicker-free, high-resolution picture(1250i/75Hz).
It can accept virtually all currently used video signal formats, reproducing them with high resolution and improved detail that is very clear to the viewer. The signal path of D.I.S.T. from input to output can be divided into 5 components: (1) Interlace-Progressive Converter; (2) Formatter; (3) Enhancer LSI; (4) Driver; and (5) Display Device.



Compared with current 100Hz technology, the advantages of D.I.S.T. mean that:

(1) Diagonal lines are smooth and free from jaggies since the number of scanning lines has been increased to 1250i.
(2) There is no field flicker, since the Formatter raises the frame rate to 75Hz.
(3) There is no line flicker, thanks to the I-P conversion to a progressive signal.
(4) Scenes with movement are also smooth, thanks to both I-P conversion and the formatting process.
(5) Vivid, sharp contours and solid presence are made possible by the support of additional technologies such as the Enhancer LSI "Super DigiPure" while faithful reproduction without blur or smear is ensured by the Wide-Range CRT Driver.
(6) The refined signal displayed on an appropriate device such as a CRT or PDP will provide unprecedented picture quality and the highest levels of resolution.
(7) Global compatibility can be enjoyed with a maximum 1500i/60Hz display for NTSC DVD or VCR playback on PAL, as well as other versatile signal sources including PAL, NTSC, DVD or D-VHS.

MULTI SCREEN FUNCTION

POP (Picture-Out-Picture)

Back programs can be seen at once. Three programs are displayed on screen right-hand side besides the program (VHF / UHF / CATV)received now.

INDEX

A favorable program can be selected from the 12 previews on the screen.

SPLIT

Different images, such as a program and video, can be simultaneously seen on two screens.

NATURAL FLAT

It became legible from any position by CRT with few reflection and reflect lumps on the flat screen.

Super Digipure

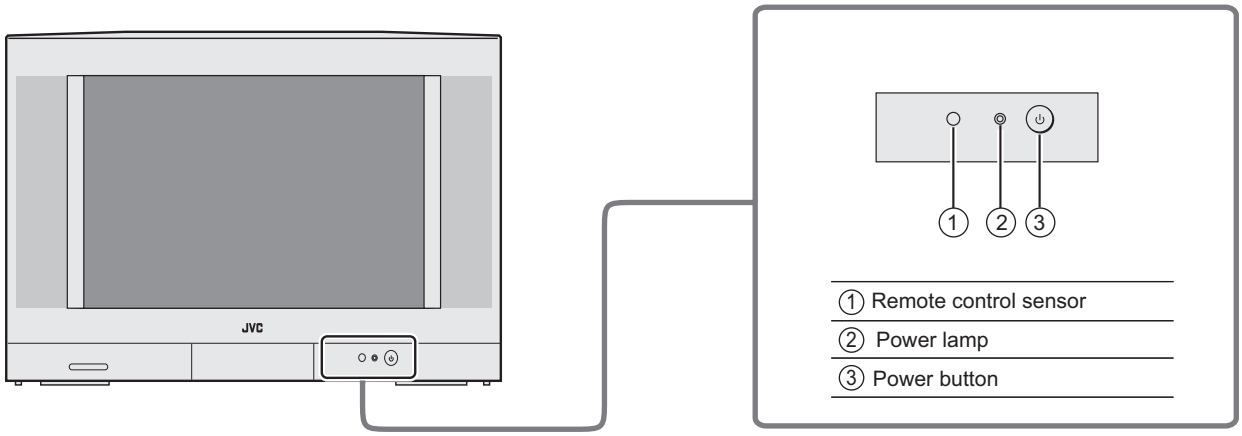
Super Digipure function create a natural-looking picture by eliminating unnecessary edges from high-contrast and crisp images.
And displayes fast-moving pictures more smoothly and naturally on the screen.

COMPONENT VIDEO INPUT TERMINAL

Since the component video input terminal is equipped, it reappears direct without deterriorating the signal from DVD or Video player.

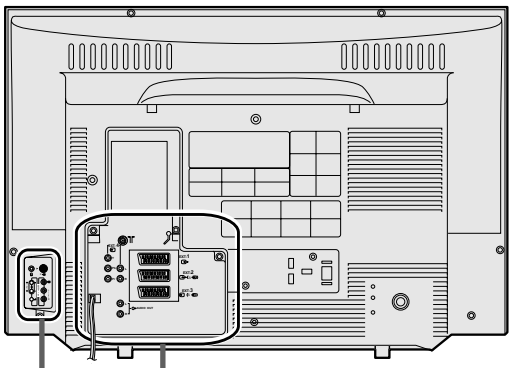
2.4 FUNCTIONS

■ FRONT PANEL

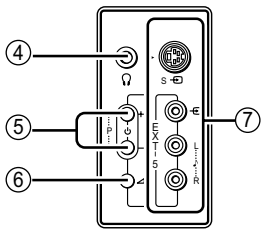


① Remote control sensor
② Power lamp
③ Power button

■ REAR PANEL

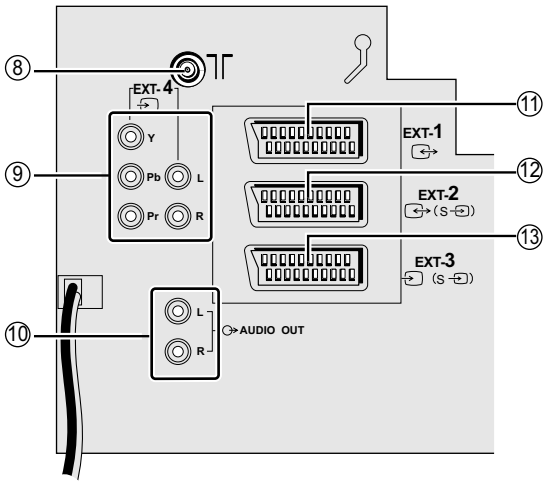


SIDE CONTROL JACK



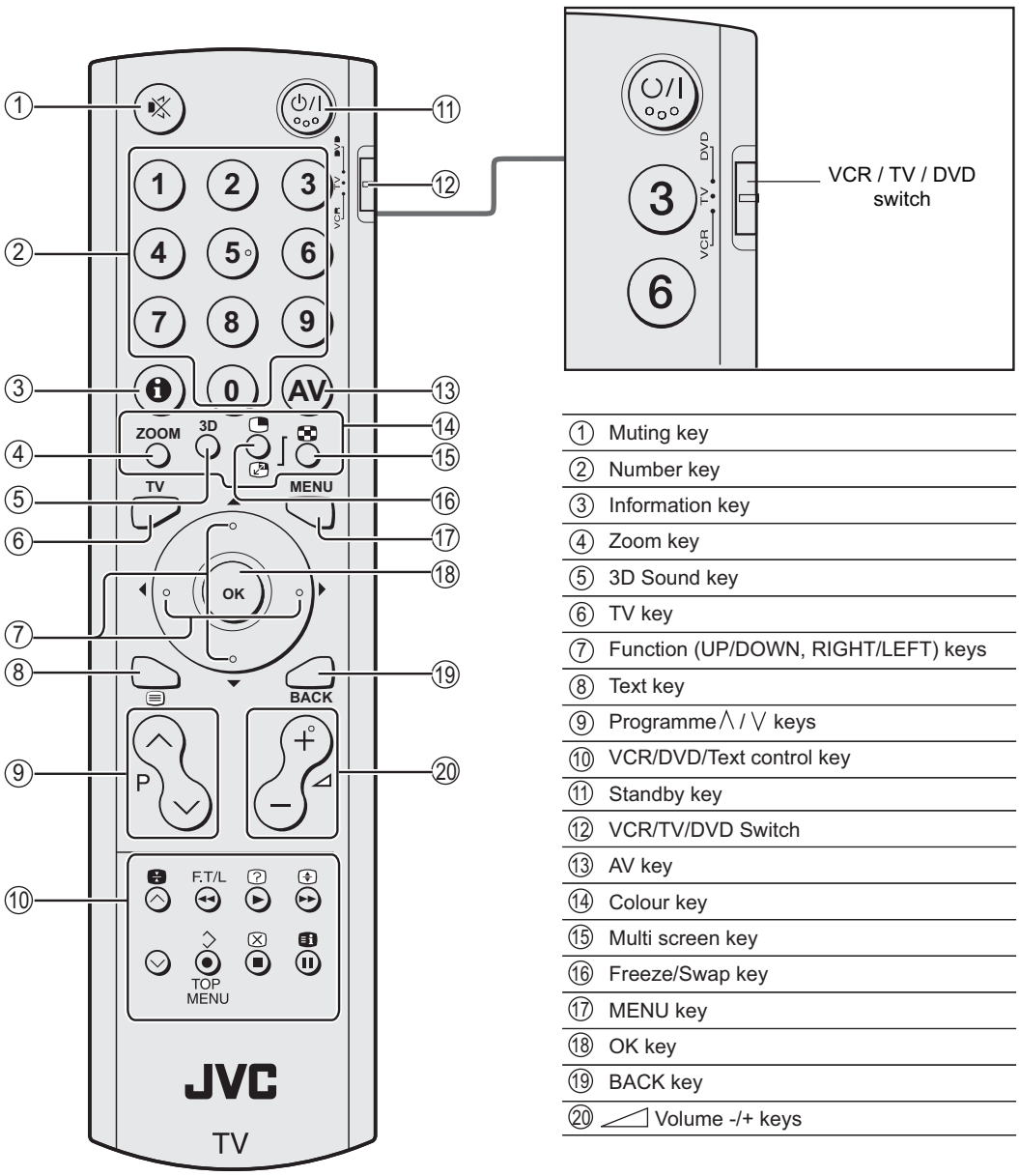
④ Headphone jack
⑤ P∧ / ∨ buttons, -/+ buttons
⑥ Volume button
⑦ EXT-5 terminal

AV TERMINAL BOARD



⑧ Aeriel terminal
⑨ EXT-4 terminal
⑩ AUDIO OUT terminal
⑪ EXT-1 terminal
⑫ EXT-2 terminal
⑬ EXT-3 terminal

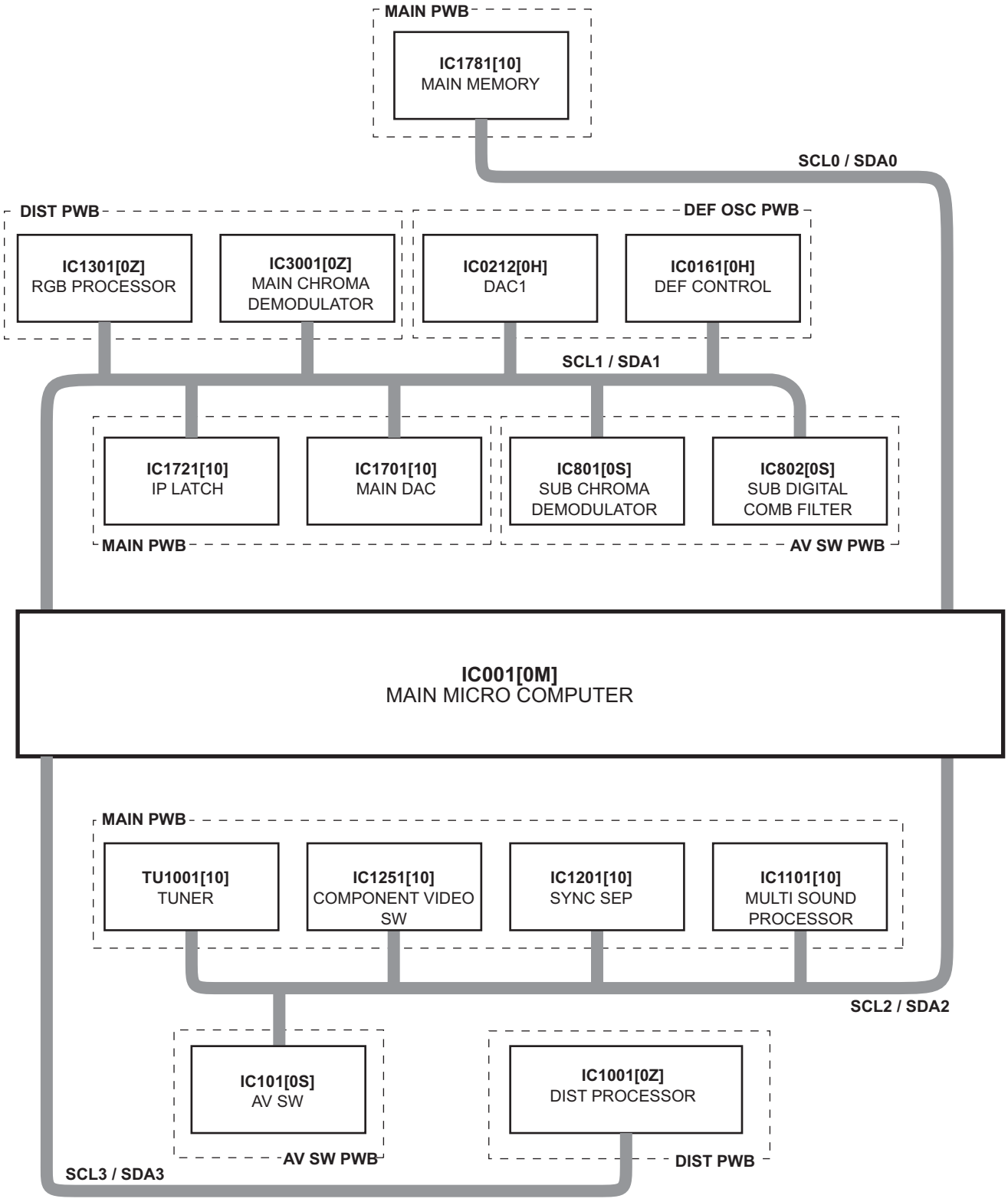
■ REMOTE CONTROL UNIT



①	Muting key
②	Number key
③	Information key
④	Zoom key
⑤	3D Sound key
⑥	TV key
⑦	Function (UP/DOWN, RIGHT/LEFT) keys
⑧	Text key
⑨	Programme ∧ / ∨ keys
⑩	VCR/DVD/Text control key
⑪	Standby key
⑫	VCR/TV/DVD Switch
⑬	AV key
⑭	Colour key
⑮	Multi screen key
⑯	Freeze/Swap key
⑰	MENU key
⑱	OK key
⑲	BACK key
⑳	Volume -/+ keys

2.5 TECHNICAL INFORMATION

2.5.1 SYSTEM BLOCK DIAGRAM



SECTION 3
DISASSEMBLY

3.1 DISASSEMBLY PROCEDURE

3.1.1 REMOVING THE REAR COVER

(1) Unplug the power plug.
(2) Remove 13 screws **[A]** as shown in the Fig. 3.
(3) Withdraw the REAR COVER toward you.

NOTE:

When reinstalling the rear cover, carefully push it inward after inserting the chassis into the rear cover groove.

3.1.2 REMOVING THE SIDE CONTROL JACK ASSY

• Remove the REAR COVER.
(1) Remove 1 screw **[B]** as shown in Fig.3.
(2) Slightly pull the SIDE CONTROL JACK ASSY toward you, and detach the claw from FRONT CABINET. Then it can be removed.
(3) Then disconnect the connector [F] and [CN016] as shown in Fig.1.

3.1.3 REMOVING THE SIDE CONTROL PWB

• Remove the REAR COVER.
• Remove the SIDE CONTROL JACK ASSY.
(1) Remove 3 claws **[C]** from backside of the SIDE CONTROL JACK ASSY as shown in Fig.1.
(2) Remove the SIDE CONTROL PWB from the SIDE CONTROL JACK ASSY.

3.1.4 REMOVING THE AV TERMINAL BOARD

• Remove the REAR COVER.
(1) Remove 7 screws **[D]** as shown in Fig.3.
(2) Remove 2 claws **[E]** at the bottom of the AV TERMINAL BOARD as shown in Fig.2.
(3) Shift the AV TERMINAL BOARD slightly in the direction of arrow **[G]**, and remove it as shown in Fig.2.

3.1.5 REMOVING THE MAIN CHASSIS

• Remove the REAR COVER.
(1) Slightly raise the MAIN CHASSIS, and release two claws at the bottom of both sides of the MAIN CHASSIS.
(2) Then withdraw the MAIN CHASSIS backward from the FRONT CABINET (If necessary, detach the wire clamp, connectors etc.).

3.1.6 REMOVING THE MAIN SPEAKER

• Remove the REAR COVER.
(1) Remove 2 screws **[H]**, and detach the MAIN SPEAKER HOLDER as shown in Fig.3 (When removing 2 screws **[H]** of the MAIN SPEAKER HOLDER, the lower side screw first, and then upper one).
(2) Remove 2 screws **[J]** attached the MAIN SPEAKER.
(3) Follow the same steps when disassemble the other hand MAIN SPEAKER.

3.1.7 CHECKING THE PW BOARD

(1) Pull out the MAIN CHASSIS (Refer to REMOVING THE MAIN CHASSIS).
(2) Erect the MAIN CHASSIS vertically so that you can easily check the PW Board from back side.

3.1.8 CAUTION

(1) When erecting the MAIN CHASSIS, be careful so that there will be no contacting with other PW Board.
(2) Before turning on power, make sure that the wire connector is properly connected.
(3) When conducting a check with power supplied, be sure to confirm that the CRT EARTH WIRE (BRAIDED ASS'Y) is connected to the CRT SOCKET PW board.

3.1.9 WIRE CLAMPING AND CABLE TYING

(1) Be sure to clamp the wire.
(2) Never remove the cable tie used for tying the wires together.
Should it be inadvertently removed, be sure to tie the wires with a new cable tie.

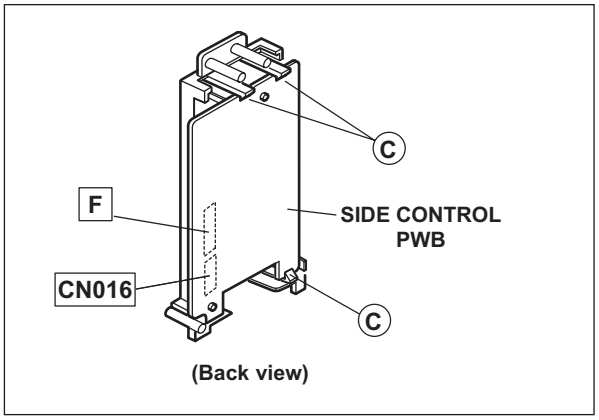


Fig.1

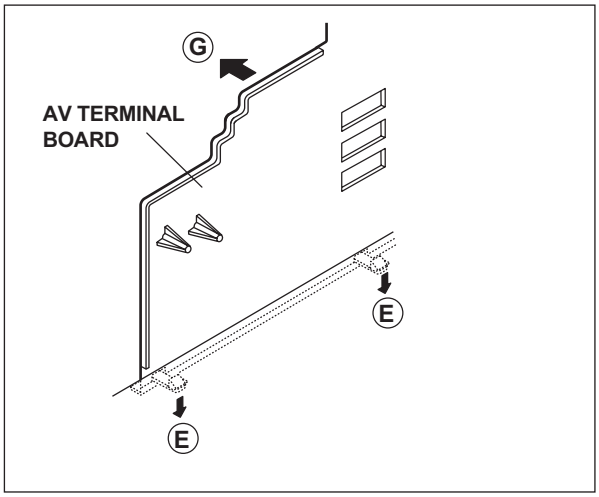


Fig.2

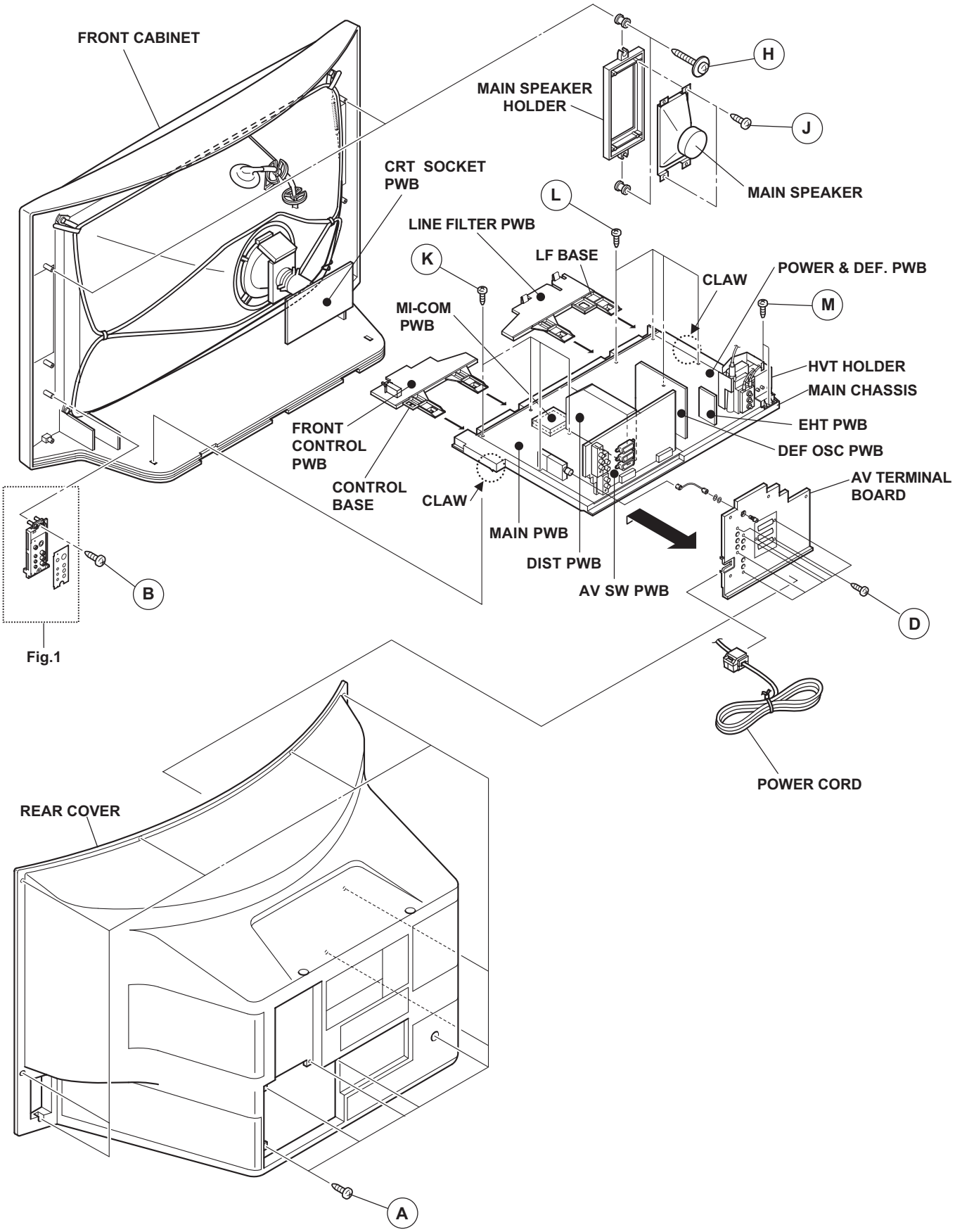

FRONT CABINET
MAIN SPEAKER HOLDER
H
J
MAIN SPEAKER
CRT SOCKET PWB
L
LINE FILTER PWB
K
LF BASE
CLAW
POWER & DEF. PWB
M
MI-COM PWB
HVT HOLDER
MAIN CHASSIS
EHT PWB
DEF OSC PWB
FRONT CONTROL PWB
CONTROL BASE
CLAW
AV TERMINAL BOARD
MAIN PWB
DIST PWB
AV SW PWB
B
D
POWER CORD
REAR COVER
A

Fig.1

Fig.3

3.2 MEMORY IC REPLACEMENT

3.2.1 MEMORY IC

This TV use the memory IC. In the memory IC, there are memorized data for correctly operating for the video and deflection circuits and more. When replacing the memory IC, be sure to use IC written with the initial values of data.

3.2.2 PROCEDURE FOR REPLACING MEMORY IC

1. Power off

Turn the power off and unplug the power plug.

2. Replace IC.

Be sure to use the memory IC written with the initial setting data.

3. Power on

Connect the power plug and turn the power on.

4. Setting of recieve channels

Set the receive channels. For setting, refer to the OPERATING INSTRUCTIONS.

5. User settings

Check the user setting items according to "FACTORY SHIPPING" at page later. If these are different, set the correct value.

6. Check the SYSTEM CONSTANT items

(1) Before operating the SERVICE MENU, confirm that the setting of VCR/TV/DVD switch of the REMOTE CONTROL UNIT is at the "TV" side. If this switch have not been properly set, you cannot enter the SERVICE MENU.
(2) Press the [INFORMATION] key and [MUTING] key on the REMOTE CONTROL UNIT simultaneously.
(3) The SERVICE MENU screen on Fig.1 will be displayed.
(4) While the SERVICE MENU is displayed, again press the [INFORMATION] key and [MUTING] key simultaneously. Then display the SYSTEM CONSTANAT SET screen as shown in Fig.2.
(5) Refer to the "SETTING VALUE OF SYSTEM CONSTANT SET", and check the setting items. when it differ, adjust it with the [FUNCTION (UP/DOWN)] key and adjust it with the [FUNCTION (RIGHT/LEFT)] keys.
(6) Press the [MENU] key to memorize the setting value.
(7) Press the [INFORMATION] key twice to return to the normal screen.

7.SERVICE MENU setting

Verify what to set in the SERVICE MENU, and set whatever is necessary. Refer to the ADJUSTMENT for setting.

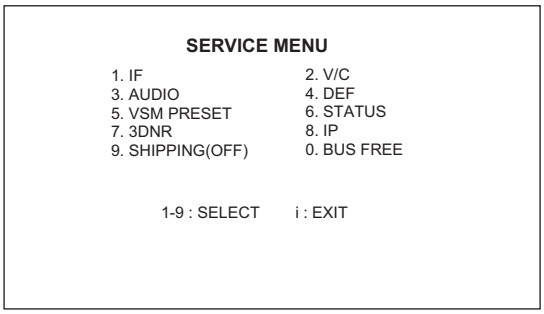


Fig.1

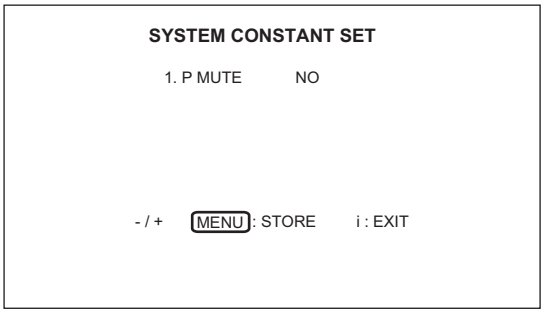
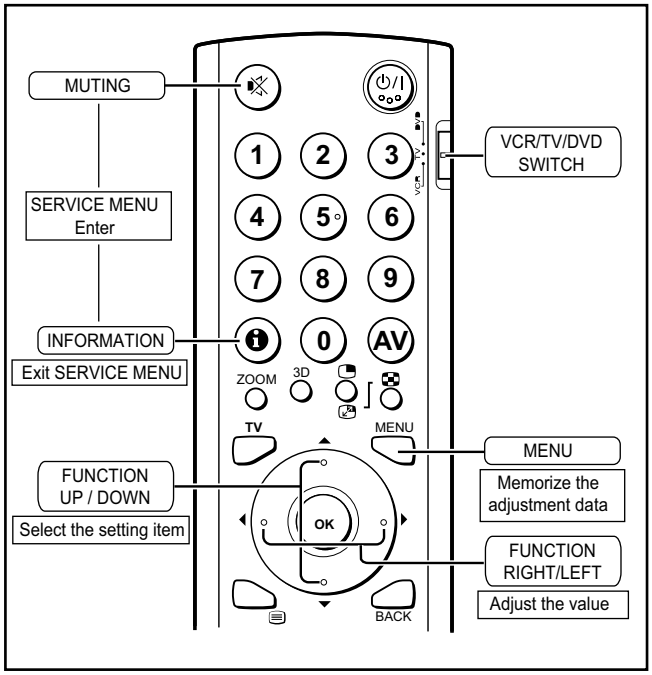


Fig.2



3.3 FACTORY SHIPPING SETTING

3.3.1 SETTING VALUE OF SYSTEM CONSTANT SET

Setting item	Variable range	Setting value
1. P MUTE	YES / NO	NO

3.3.2 SETTING OF REMOTE CONTROL UNIT

Setting item	Setting value	Setting item	Setting value
POWER	ON	3D SOUND	OFF
VOLUME	10	ZOOM	PANORAMIC
CHANNEL	1	MULTI SCREEN	OFF

3.3.3 SETTING OF MENU SCREEN

Setting item	Setting value	Setting item	Setting value
PICTURE SETTING		**FEATURES**	
PICTURE MODE	BRIGHT	SLEEP TIMER	OFF
CONTRAST	Centre	BLUE BACK	ON
BRIGHT	Centre	CHILD LOCK	ID:-----, ALL CH OFF
SHARP	Centre	APPEARANCE	TYPE A
COLOUR	Centre	**SETUP**	
HUE	Centre	LANGUAGE	ENGLISH
COLOR TEMP.	COOL	PICTURE TILT	Centre
DIGITAL VNR	AUTO(LOW)	EDIT / MANUAL	PRESET CH only
Super Digipure	AUTO		others : Blank
MOVIE THEATER	AUTO	DECORDER(EXT-2)	OFF
Colour Digipure	ON	**EXT SETTING**	
COLOR SYSTEM	Depend on preset channel	S-IN	EXT-2
4:3 AUTO ASPECT	PANORAMIC	ID LIST	Blank
SOUND SETTING		DUBBING	EXT-2
BASS	Centre		
TREBLE	Centre		
BALANCE	Centre		
HEADPHONE VOLUME	10		
3D CINEMA SOUND	ON		
SURROUND	MID		
BASS BOOST	MID		

3.3.4 SERVICE MENU SETTING ITEMS

Service menu	Sub menu item	Description
1. IF	1. VCO, 2. ATT	
2. V/C	1. CUT_OF_R ~ 15. RY_ANGLE	
3. AUDIO	1. ERROR LIMIT ~ 21. CENT TRE	It is no required for adjustment. Don't change the value.
4. DEF	1. FREE-RUN ~ 11. V. LIN	
5. VSM PRESET	1. CONT ~ 8. WDR B	
6. STATUS	1. SOFT ~ 4. IC	It is no required for adjustment. Don't change the value.
7. 3DNR	1. YNR LIM ~ 90. HGCON21	It is no required for adjustment. Don't change the value.
8. IP	1. ASL GAIN ~ 70. BVMCORINGON	It is no required for adjustment. Don't change the value.
9. SHIPPING	Initialize the all data. It is no requirement for adjustment.	
0. BUS FREE	Stops the all I^2C bus communication. It is no requirement for adjustment.	

3.4 REPLACEMENT OF CHIP COMPONENT

3.4.1 CAUTIONS

(1) Avoid heating for more than 3 seconds.
(2) Do not rub the electrodes and the resist parts of the pattern.
(3) When removing a chip part, melt the solder adequately.
(4) Do not reuse a chip part after removing it.

3.4.2 SOLDERING IRON

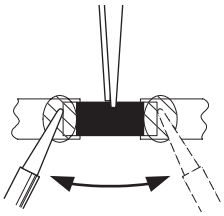
(1) Use a high insulation soldering iron with a thin pointed end of it.
(2) A 30w soldering iron is recommended for easily removing parts.

3.4.3 REPLACEMENT STEPS

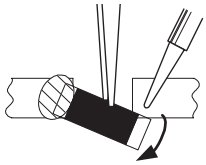
1. How to remove Chip parts

[Resistors, capacitors, etc.]

(1) As shown in the figure, push the part with tweezers and alternately melt the solder at each end.



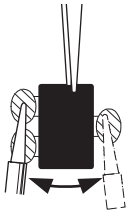
(2) Shift with the tweezers and remove the chip part.



[Transistors, diodes, variable resistors, etc.]

(1) Apply extra solder to each lead.

(2) As shown in the figure, push the part with tweezers and alternately melt the solder at each lead. Shift and remove the chip part.



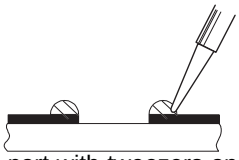
NOTE :

After removing the part, remove remaining solder from the pattern.

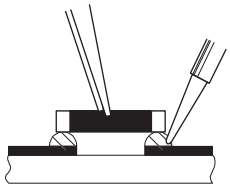
2. How to install Chip parts

[Resistors, capacitors, etc.]

(1) Apply solder to the pattern as indicated in the figure.

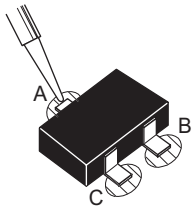


(2) Grasp the chip part with tweezers and place it on the solder. Then heat and melt the solder at both ends of the chip part.

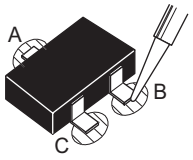


[Transistors, diodes, variable resistors, etc.]

(1) Apply solder to the pattern as indicated in the figure.
(2) Grasp the chip part with tweezers and place it on the solder.
(3) First solder lead **A** as indicated in the figure.



(4) Then solder leads **B** and **C**.



SECTION 4
ADJUSTMENT

4.1 ADJUSTMENT PREPARATION

(1) There are 2 ways of adjusting this TV : One is with the REMOTE CONTROL UNIT and the other is the conventional method using adjustment parts and components.
(2) The adjustment using the REMOTE CONTROL UNIT is made on the basis of the initial setting values. The setting values which adjust the screen to the optimum condition can be different from the initial setting values.
(3) Make sure that connection is correctly made AC to AC power source.
(4) Turn on the power of the TV and measuring instruments for warning up for at least 30 minutes before starting adjustments.
(5) If the receive or input signal is not specified, use the most appropriate signal for adjustment.
(6) Never touch the parts (such as variable resistors, transformers and condensers) not shown in the adjustment items of this service adjustment.
(7) Preparation for adjustment. Unless otherwise specified in the adjustment items, preset the following functions with the REMOTE CONTROL UNIT.

Item	Preset value	Item	Preset value
PICTURE MODE	STANDARD	Super Digipure	ON
CONTRAST	Centre	MOVIE THEATER	AUTO
BRIGHT	Centre	BASS / TREBLE / BALANCE	Centre
SHARP	Centre	3D CINEMA SOUND	OFF
COLOUR	Centre	ZOOM	FULL
HUE	Centre	SLEEP TIMER	OFF
COLOUR TEMP	COOL	BLUE BACK	OFF
DIGITAL VNR	AUTO(LOW)		
Colour Digipure	AUTO		

4.2 MESURING INSTRUMENT AND FIXTURES

(1) DC voltmeter (or digital voltmeter)
(2) HV voltmeter
(3) Oscilloscope
(4) Signal generator (Pattern generator : PAL, SECAM, NTSC)
(5) Remote control unit

4.3 ADJUSTMENT ITEM

■ **B1 POWER SUPPLY check**

■ **HIGH VOLTAGE**

■ **HORIZONTAL FREQUENCY**

■ **FOCUS**

■ **IF VCO check**

■ **FOCUS ADJUSTMENT**

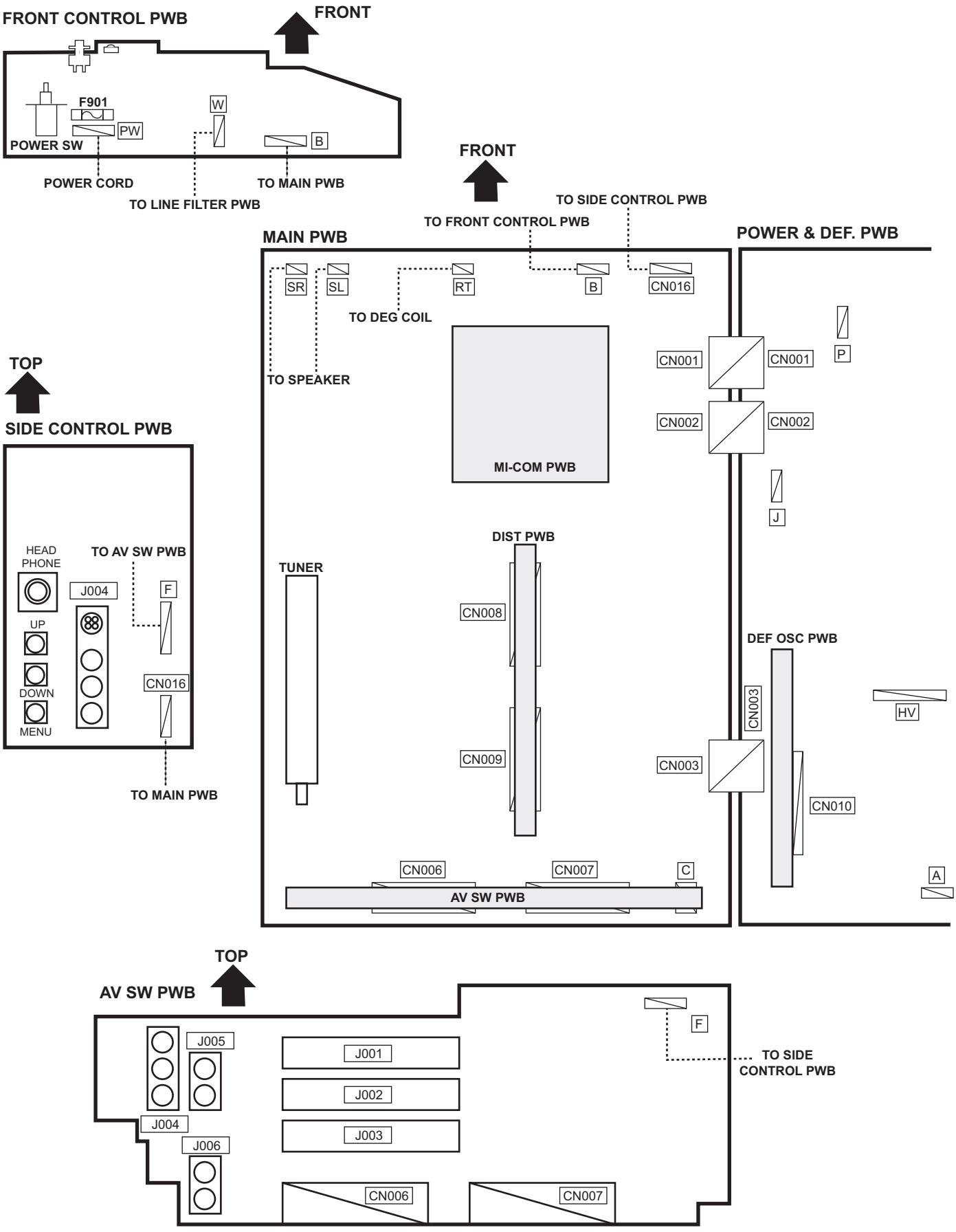
■ **VSM PRESET**

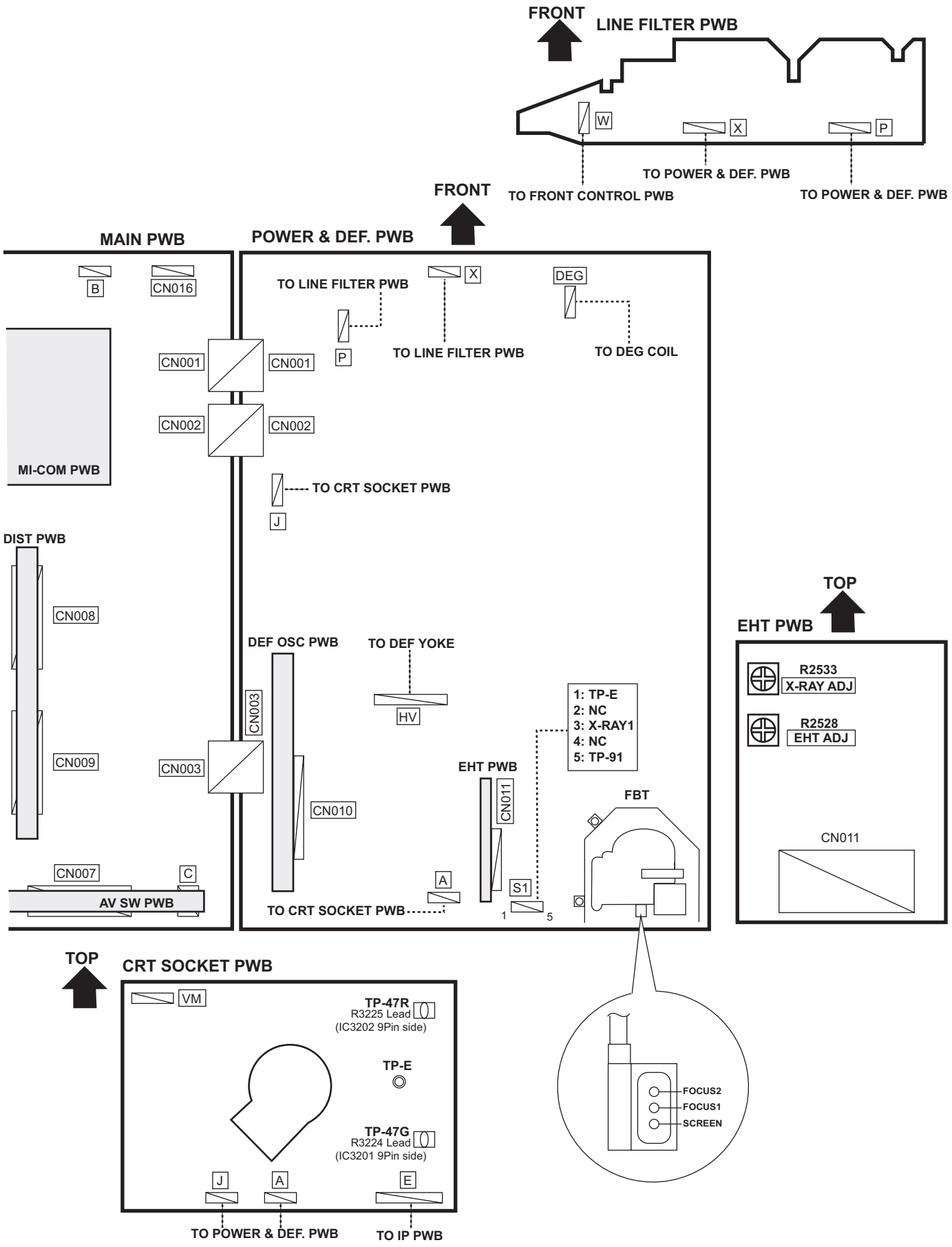
■ **VIDEO CIRCUIT**
WHITE BALANCE (LOW LIGHT)
WHITE BALANCE (HIGH LIGHT)
SUB BRIGHT
SUB CONTRAST
SUB COLOR
SUB TINT

■ **DEFLECTION CIRCUIT**
V SHIFT
V SIZE
H POSITION
H SIZE
SIDE PINC
TRAPEZIUM
CORNER PIN
V LINEARITY

■ **SUB SCREEN**
CONTRAST
COLOUR
TINT

4.4 ADJUSTMENT LOCATIONS




FRONT
LINE FILTER PWB
W
X
P
TO POWER & DEF. PWB
TO FRONT CONTROL PWB
TO POWER & DEF. PWB
FRONT
MAIN PWB
POWER & DEF. PWB
B
CN016
TO LINE FILTER PWB
X
DEG
P
TO LINE FILTER PWB
TO DEG COIL
CN001
CN001
CN002
CN002
MI-COM PWB
TO CRT SOCKET PWB
J
DIST PWB
CN008
CN009
DEF OSC PWB
TO DEF YOKE
HV
CN003
CN003
CN010
1: TP-E
2: NC
3: X-RAY1
4: NC
5: TP-91
EHT PWB
CN011
FBT
CN007
C
AV SW PWB
A
S1
1
5
TO CRT SOCKET PWB
TOP
EHT PWB
R2533
X-RAY ADJ
R2528
EHT ADJ
CN011
TOP
CRT SOCKET PWB
VM
TP-47R
R3225 Lead
(IC3202 9Pin side)
TP-E
TP-47G
R3224 Lead
(IC3201 9Pin side)
J
A
E
TO POWER & DEF. PWB
TO IP PWB
FOCUS2
FOCUS1
SCREEN

4.5 TOOL OF SERVICE MENU OPERATION

Operate the SERVICE MENU with the REMOTE CONTROL UNIT.

4.5.1 SERVICE MENU ITEMS

With the SERVICE MENU, various adjustment can be made, and they are broadly classified in the following items of settings.

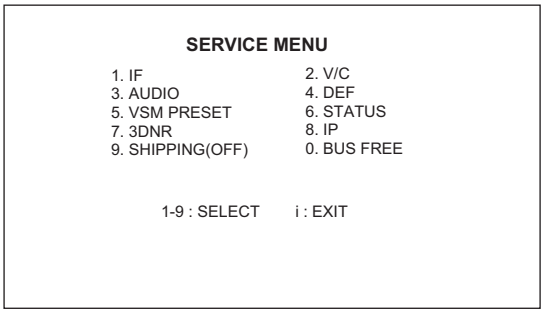
Sub Menu item	Description
1.IF	This mode adjusts the IF circuit.
2.V/C	This mode adjusts the VIDEO circuit
3.AUDIO	This mode adjusts the AUDIO circuit. **[It is no requirement for adjustment.]**
4.DEF	This mode adjusts the DEFLECTION circuit.
5.VSM PRESET	This mode sets the VSM (Video Status Memory) data.
6.STATUS	This mode shows the I^2C memory data software version and information. **[It is no requirement for adjustment.]**
7.3DNR	This mode adjusts the 3D NR (three-Dimension Noise Reduction) circuit. **[It is no requirement for adjustment.]**
8.IP	This mode adjusts the DIST circuit. **[It is no requirement for adjustment.]**
9.SHIPPING	This mode initialize the data for factory shipment. Not to select this mode during adjusting. **[It is no requirement for adjustment.]**
0.BUS FREE	This mode stops the all I^2C bus communication. Not to select this mode during adjusting. **[It is no requirement for adjustment.]**

4.5.2 BASIC OPERATION IN SERVICE MENU

4.5.2.1 HOW TO ENTER THE SERVICE MENU

Before operating SERVICE MENU, confirm that the setting of VCR/TV/DVD switch of the REMOTE CONTROL UNIT is at the "TV" side. If this switch have not been properly set, you cannot enter the SERVICE MENU.

Press the [INFORMATION] key and [MUTING] key of the REMOTE CONTROL UNIT simultaneously. Then SERVICE MENU screen will be displayed as shown figure.



4.5.3 SUB MENU SCREEN SELECTION

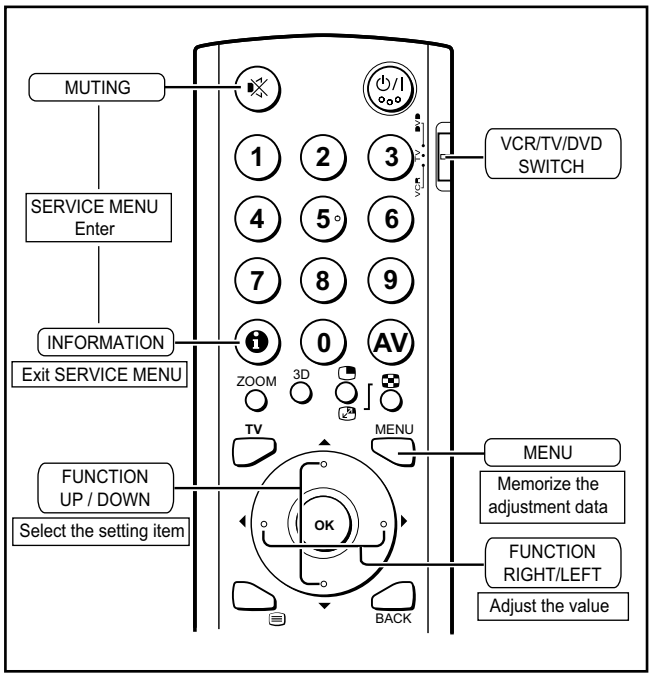
Press one of the CHANNEL number key with the remote control unit, and select the SUB MENU SCREEN from SERVICE MENU.

4.5.4 MEMORIZE THE ADJUSTMENT DATA

When adjustment is completed, press the [MENU] key to memorize the adjustment value. If not to do it, adjustment data is not memorized to the memory IC. And if exit the adjustment mode before memorize the data, the adjustment value which you change is canceled.

4.5.5 RELEASE OF SERVICE MENU

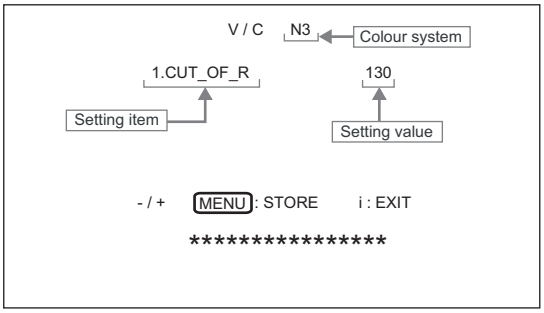
When adjustment is completed, press the [INFORMATION] key. Then return to the SERVICE MENU screen.
Again press the [INFORMATION] key, you can return to the normal screen.



4.5.6 DESCRIPTION OF SERVICE MENU SCREEN

Describe the screen when display the sub menu screen. For example, describe about 2. V/C, 4. DEF and 5. VSM PRESET.

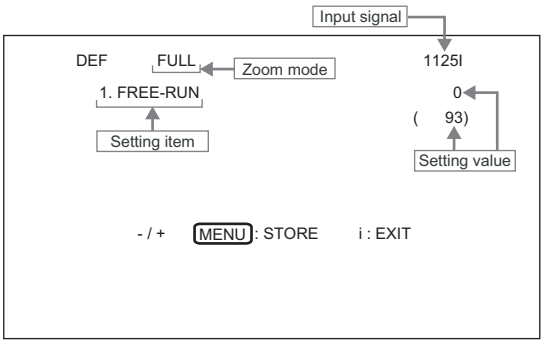
4.5.6.1 2. V/C



Colour System

PAL : PAL
SECAM : SECAM
N3 : NTSC3.58
N4 : NTSC4.43

4.5.6.2 4. DEF



Zoom mode

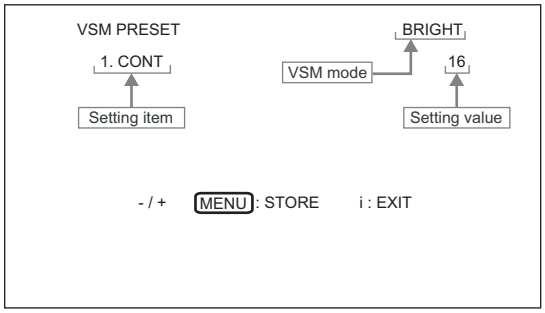
FULL : FULL

Display only FULL mode. Adjustment in other zoom modes are not required.

Input signal

900i : 900i
1125i : 1125i
1350i : 1350i
602p : 602p

4.5.6.3 5. VSM PRESET



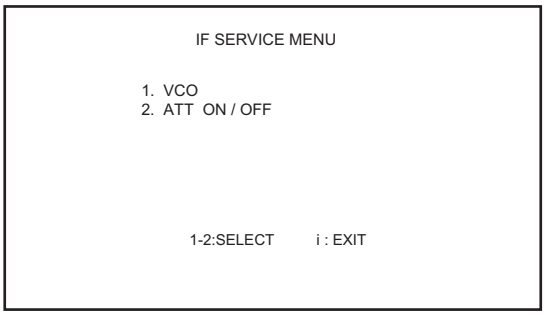
VSM mode

BRIGHT : BRIGHT
STD : STANDARD
SOFT : SOFT
COOL : COOL
NORMAL : NORMAL
WARM : WARM

4.5.7 SETTING METHOD OF SUB MENU SCREEN

4.5.7.1 1. IF [Perform only confirmation]

When enter to the 1. IF adjustment screen, display the sub select screen as shown in figure. Then select the one of 1.VCO or 2. ATT with CHANNEL number key on the remote control unit.



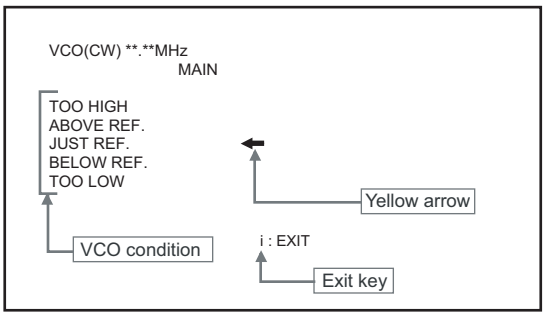
1. VCO screen

1) VCO condition

Display the VCO condition. The letter where yellow arrow points is current VCO condition.

2) Exit

Press the [INFORMATION] key twice to exit to the service menu.



4.5.7.2 2. V/C, 4. DEF and 5. VSM PRESET

The operation method in each screen is almost the same.

1) Setting item

Press the [FUNCTION (UP/DWON)] key to select the setting item.

2) Setting value

Press the FUNCTION (RIGHT/LEFT)] key to adjust the value.

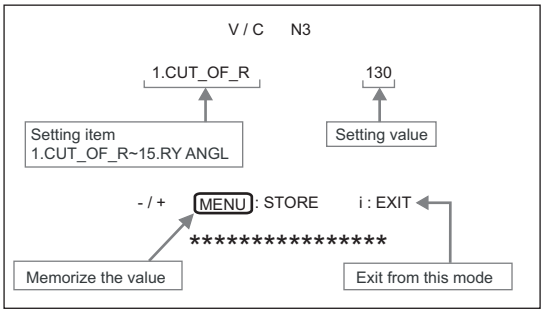
3) Memorize

Press the [MENU] key to memorize the adjustment value.

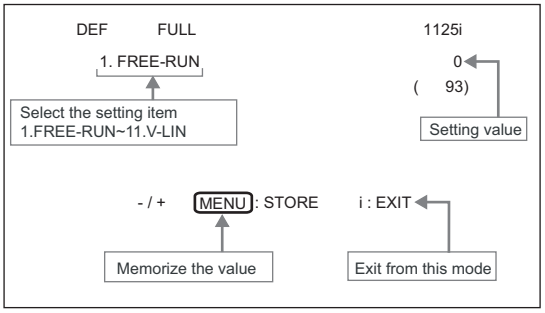
4) Exit

Press the [INFORMATION] key twice to exit to the service menu.

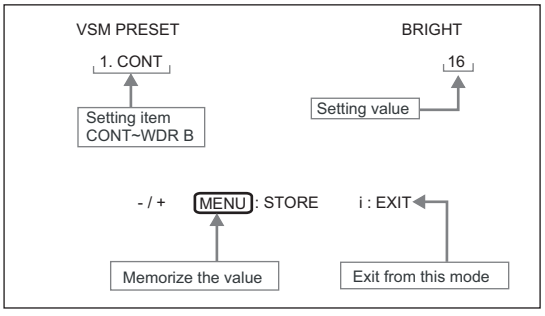
2. V/C



4. DEF



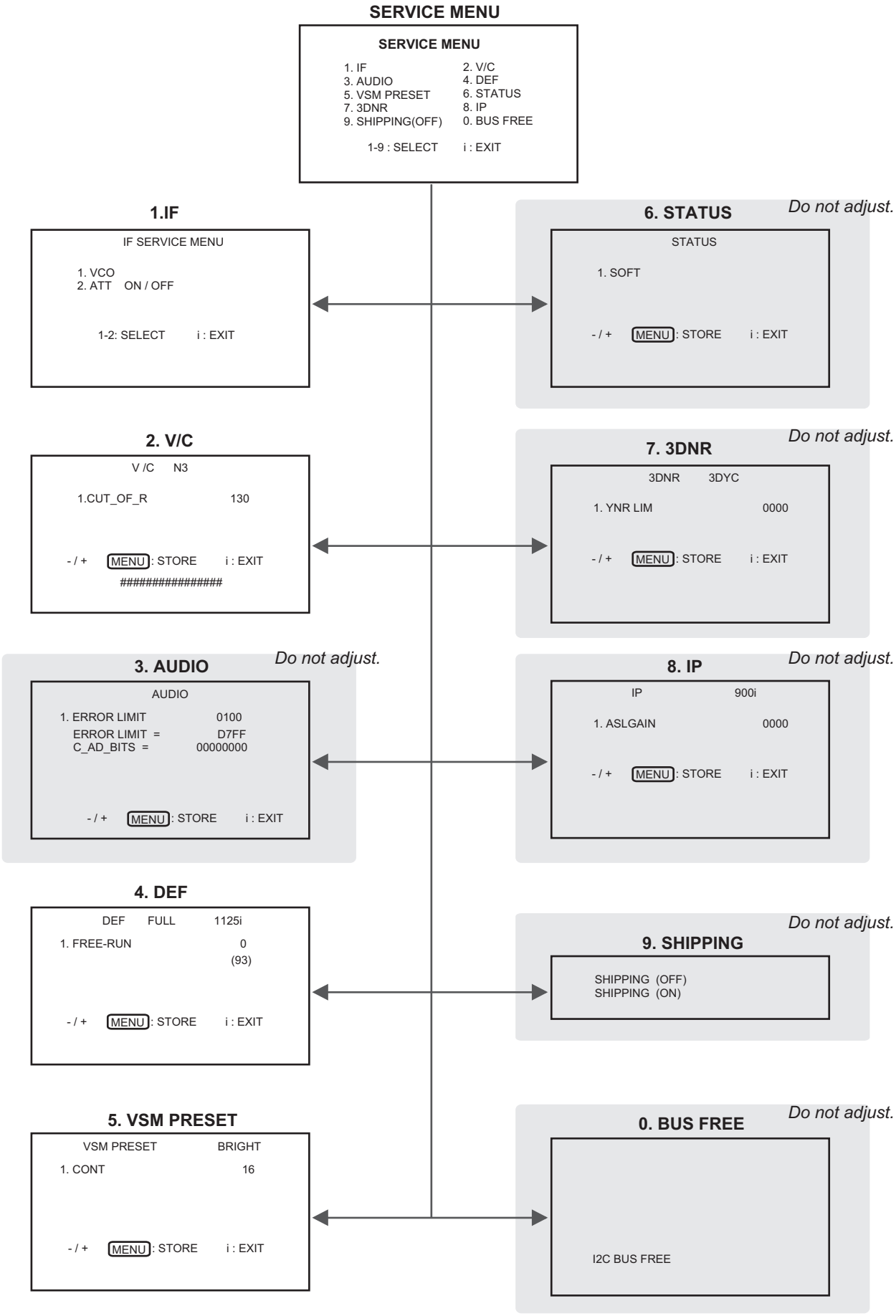
5. VSM PRESET



4.5.7.3 3. AUDIO, 6. STATUS, 7. 3DNR, 8. IP, 9. SHIPPING and 0. BUS FREE

It is no requirement for adjustment. Do not change the values in these sub menu screen.

4.6 SERVICE MENU FLOW CHART



4.7 INITIAL SETTING VALUE OF SERVICE MENU

(1) Adjustment of the SERVICE MENU is made on the basis of the initial setting values. However, the new setting values which displays on the screen in its optimum condition may differ from the initial setting value.
(2) Do not change the initial setting values of the items not listed in "ADJUSTMENT PROCEDURE".
(3) "---" is impossible to adjust or not requirement to adjustment.

4.7.1 [1. IF]

Setting item	Variable range	Initial setting value
2.ATT	ON/OFF	OFF

4.7.2 [2. V/C]

Setting item	Variable range	Initial setting value											
		RF		External (Composite / S)				External (Component)					
		PAL	SECAM	PAL	SECAM	NTSC 3.58	NTSC 4.43	625i	525i	625p	525p	1125i	1125i
1.CUT_OF R	000~255	130						130		0		0	
2.CUT_OF G	000~255	130						130		0		0	
3.CUT_OF B	000~255	130						130		0		0	
4.DRIVE_R	000~255	64						64		0		0	
5.DRIVE_G	000~255	64						64		0		0	
6.DRIVE_B	000~255	64						64		0		0	
7.BRIGHT	000~255	130						130		0		0	
8.CONT	000~127	52						52		0		0	
9.COLOR	000~127	80	55	0	0	63	0	0	0	0	0	0	0
10.HUE	000~127	0	0	0	0	63	0	68	68	0	0	0	0
11.TWN_CNT	000~015	9						0	0	0	0	0	0
12.TWN_COL	000~015	9	9	0	0	9	0	0	0	0	0	0	0
13.TWN_TNT	000~000	0	0	0	0	35	0	0	0	0	0	0	0
14.BY_GAIN	000~063	43		43		43	0	0	0	0	0	0	0
15.RY_ANGL	000~015	7		7		7	0	0	0	0	0	0	0

4.7.3 [5. VSM PRESET]

Setting item	Variable range	Initial setting value					
		PICTURE MODE			COLOUR TEMP		
		BRIGHT	STANDARD	SOFT	COOL	NORMAL	WARM
CONT	-16~16	+16	+2	-8	-----	-----	-----
BRIGHT	-16~16	0	0	0	-----	-----	-----
SHARP	-16~16	0	0	-2	-----	-----	-----
COLOUR	-16~16	0	0	-2	-----	-----	-----
TINT	-16~16	0	0	0	-----	-----	-----
WDR R	-64~63	-----	-----	-----	-6	0	+11
WDR G	-64~63	-----	-----	-----	0	0	0
WDR B	-64~63	-----	-----	-----	+12	0	0

4.7.4 [3. AUDIO]

Setting item	Variable range	Initial setting value
1.ERROR LIMIT	0000H~FFF0H	100H
2.A2 ID THR	0000H~00FFH	19H
3.Q-PEAK	B/G→I→D/K→L	-----
4.SOUND LEVEL	-----	FFFFH

Setting item	Variable range	Initial setting value		
		SURROUND		
		LOW	MID	HIGH
5.VIRT_MODE	PANORAMA / 3D PANORAMA	3D PANORAMA	3D PANORAMA	3D PANORAMA
6.VIRT_SPAT	0000H~007FH	0FH	28H	32H
7.VIRTUAL EF	0000H~007FH	0CH	23H	2FH

Setting item	Variable range	Initial setting value
8.SPATIAL EF	0000H~00FFH	3FH

Setting item	Variable range	Initial setting value				
		BASS BOOST				
		OFF	MONO	LOW	MID	HIGH
9.MB STR	0000H~007FH	00H	00H	25H	32H	39H
10.MB HMC	0000H~007FH	00H	00H	00H	00H	00H
11.MB HP	0000H~001EH	00H	00H	08H	00H	00H
12.MB LP	0000H~001EH	00H	00H	14H	12H	10H
13.MB LIMIT	00E0H~0000H	00H	00H	00H	F6H	F1H
14.SUBW LEVEL	0080H~000CH	00H	00H	00H	00H	00H
15.SUBW FREQ	0000H~0028H	00H	00H	1CH	00H	00H
16.SUBW CHAR	0000H~0003H	00H	00H	01H	00H	00H
17.SUBW HP	0000H~0002H	00H	00H	02H	00H	00H
18.VOL CLP M	0000H~0003H	03H	03H	00H	00H	00H

Setting item	Variable range	Initial setting value
19.A PROTECT	0000H~0100H	100H
20.CENT BASS	00F1H~000FH	0H
21.CENT TRE	00F1H~000FH	0H

4.7.5 [4. DEF]

Setting item	Variable range	Initial setting value			
		900i	1125i	1350i	602p
1.FREE-RUN	0~225	90	0	0	0
2.V-SHIFT	0~63	23	0	0	0
3.V-SIZE	0~127	43	0	0	-3
4.H-CENT	255~0	47	0	0	0
5.H-SIZE	0~63	32	0	0	0
6.TRAPEZ	0~63	33	0	0	0
7.EW-PIN	0~63	25	0	0	0
8.COR-UP	0~15	8	0	0	0
9.COR-LOW	0~15	8	0	0	0
10.V.S-COR	0~63	24	0	0	0
11.V-LIN	0~63	41	0	3	0

4.7.6 [7.3DNR]

Setting item	Variable range	Initial setting value									
		RF				External (Composite / S)				External (Component)	
		PAL	SECAM	NTSC 3.58	NTSC 4.43	PAL	SECAM	NTSC 3.58	NTSC 4.43	625i	525i
1. YNR LIM	0000~0003	03									
2. YNR K	0000~0003	02									
3. YNR GAIN	0000~0003	00									
4. CNR LIM	0000~0003	03									
5. CNR K	0000~0003	02									
6. CNR GAIN	0000~0003	01									
7. LTI GAIN	0000~0003	00	01	00	00	00	01	00	00	00	00
8. LTI SLICE	0000~0003	00	00	00	00	00	00	00	00	00	00
9. CTI GAIN	0000~0003	02	03	03	02	02	03	03	02	02	02
10. CTI SLICE	0000~0003	00	00	00	00	00	00	00	00	00	00
11. BRIGHTNESS	0000~000F	01				01				01	
12. CONTRAST	0000~00FF	24				24				30	
13. AC M SLP	0000~0003	03	03	01	03	03	03	01	03	03	03
14. AC S SLP	0000~0003	03	03	02	03	03	03	02	03	03	03
15. AY M SLP	0000~0003	02	02	02	02	02	02	02	02	02	02
16. AY S SLP	0000~0003	02	02	02	02	02	02	02	02	02	02
17. AC M E SET	0000~0003	02	02	03	02	02	02	03	02	02	02
18. AC M F SET	0000~0003	02	02	03	02	02	02	03	02	02	02
19. AC S E SET	0000~0003	00	00	02	00	00	00	02	00	00	00
20. AC S F SET	0000~0003	00	00	02	00	00	00	02	00	00	00
21. AY M E SET	0000~0003	02	02	03	02	02	02	03	02	02	02
22. AY M F SET	0000~0003	02	02	03	02	02	02	03	02	02	02
23. AY S E SET	0000~0003	00	00	01	00	00	00	01	00	00	00
24. AY S F SET	0000~0003	00	00	01	00	00	00	01	00	00	00
25. BC M SLP	0000~0003	03	03	03	03	03	03	03	03	03	03
26. BC S SLP	0000~0003	03	03	02	03	03	03	02	03	03	03
27. BY M SLP	0000~0003	00	00	03	00	00	00	03	00	00	00
28. BY S SLP	0000~0003	00	00	02	00	00	00	02	00	00	00
29. BC M E SET	0000~0003	02	02	03	02	02	02	03	02	02	02
30. BC M F SET	0000~0003	02	02	02	02	02	02	02	02	02	02
31. BC S E SET	0000~0003	00	00	02	00	00	00	02	00	00	00
32. BC S F SET	0000~0003	00	00	02	00	00	00	02	00	00	00
33. BY M E SET	0000~0003	00	00	03	00	00	00	03	00	00	00
34. BY M F SET	0000~0003	00	00	03	00	00	00	03	00	00	00
35. BY S E SET	0000~0003	00	00	02	00	00	00	02	00	00	00
36. BY S F SET	0000~0003	00	00	02	00	00	00	02	00	00	00
37. BC M UP	0000~0001	01	01	01	01	01	01	01	01	01	01
38. C E CMP	0000~0007	04	04	05	04	04	04	05	04	04	04
39. C S CMP	0000~000F	08	08	01	08	08	08	01	08	08	08
40. F1HER	0000~0003	01	01	01	01	01	01	01	01	01	01

Setting item	Variable range	Initial setting value									
		RF				External (Composite / S)				External (Component)	
		PAL	SECAM	NTSC 3.58	NTSC 4.43	PAL	SECAM	NTSC 3.58	NTSC 4.43	625i	525i
41. F1VER	0000~0003	01	01	01	01	01	01	01	01	01	01
42. MREF	0000~0007	05	05	02	05	05	05	02	05	05	05
43. CDEYE	0000~0003	01	01	02	01	01	01	02	01	01	01
44. YDEYE	0000~0003	01	01	00	01	01	01	00	01	01	01
45. MDS	0000~0001	00	00	00	00	00	00	00	00	00	00
46. MDMPL	0000~0001	00	00	00	00	00	00	00	00	00	00
47. MDMBL	0000~0001	01	01	00	01	01	01	00	01	01	01
48. 3D STD	0000~0001	00	00	00	00	00	00	00	00	00	00
49. 2ASS	0000~0001	01	01	01	01	01	01	01	01	01	01
50. 2ASEL	0000~0001	00	00	00	00	00	00	00	00	00	00
51. 2ALEV	0000~0007	01	01	01	01	01	01	01	01	01	01
52. 2ASSCM	0000~0003	02	02	02	02	02	02	02	02	02	02
53. CROSS	0000~0001	00	00	01	00	00	00	01	00	00	00
54. CHLPF	0000~0001	00	00	00	00	00	00	00	00	00	00
55. YDCLOFF	0000~0001	01	01	00	01	01	01	00	01	01	01
56. YDNRW	0000~0001	00	00	00	00	00	00	00	00	00	00
57. CDNRW	0000~0001	00	00	01	00	00	00	01	00	00	00
58. YDCMP	0000~000F	08	08	00	08	08	08	00	08	08	08
59. HDAMP1	0000~0007	03				00				01	
60. HDGAIN1	0000~001F	08				13				16	
61. HDAMP2	0000~0007	04				03				03	
62. HDGAIN2	0000~001F	06				07				28	
63. HDAMP3	0000~0007	05				04				04	
64. HDGAIN3	0000~001F	03				03				12	
65. SHCTRL	0000~003F	63									
66. MUTE	0000~0001	00									
67. CMUTE	0000~0001	00									
71. BCFOFF	0000~0001	01									
72. CGAIN	0000~0007	07									
73. EN NOI H SY	0000~0007	04									
74. EN NOI H WZ	0000~0007	04									
75. EN NOI V S[	0000~0007	00									
76. EN NOI V WY	0000~0003	01									
77. HDPH	0000~000F	00									
78. VDPH	0000~000F	00									
79. VPHS	0000~0007	00									
80. EN PIXH S	0000~000F	00									

Setting item	Variable range	Initial setting value									
		RF				External (Composite / S)				External (Component)	
		PAL	SECAM	NTSC 3.58	NTSC 4.43	PAL	SECAM	NTSC 3.58	NTSC 4.43	625i	525i
81. EN PIXH W	0000~000F	00									
82. EN PIXV S	0000~000F	00									
83. EN PIXV A	0000~0001	00									
84. HBLK S	0000~000F	00									
85. HBLK W	0000~000F	00									
86. FHST S	0000~000F	00									
87. FVST S	0000~000F	00									
88. EXTCLP	0000~000F	00									
89. HGCON12	0000~000F	09				03				12	
90. HGCON21	0000~000F	10				14				14	

4.7.7 [8. IP]

Setting item	Variable range	Initial setting value								
		Single screen								
		RF		External (Composite / S)		External (Component)				External (RGB)
		625i	525i	625i	525i	625i	525i	625p / 525p	1125i	
1. ASLGAIN	0~63	24	24	24	24	24	24	14	13	24
2. ASLVHGAIN	0~63	24	24	24	8	8	8	0	5	8
3. ASLHGAIN	0~63	21	21	26	26	26	26	18	23	26
4. ASLVPEAKFREQ	0~3	1	1	1	1	1	1	1	2	1
5. ASLHPEAKFREQ	0~7	1	1	1	1	1	1	1	3	1
6. ASLEDGECTRL	0~63	37	37	37	37	37	37	18	15	37
7. ASLEDGECTRLON	0~1	1	1	1	1	1	1	1	1	1
8. ASLCORINGON	0~1	1	1	1	1	1	1	1	1	1
9. ASLENHACEON	0~1	1	1	1	1	1	1	1	1	1
10. ASVPEAKFREQ	0~3	2	2	2	2	2	2	3	2	2
11. ASHPEAKFREQ	0~7	4	4	4	4	4	4	4	2	4
12. ASYLCONTROL	0~63	32	32	32	32	32	32	32	8	32
13. ASYLCTRLON	0~1	1	1	1	1	1	1	1	1	1
14. ASYHCONTROL	0~63	63	63	63	63	63	63	63	63	63
15. ASYHCTRLON	0~1	1	1	1	1	1	1	1	1	1
16. ASCCONTROL	0~63	7	7	16	16	16	16	23	32	16
17. ASENHANCEON	0~1	----	----	----	----	----	----	----	----	----
18. ASPMBALANCE	0~63	1	1	6	6	6	6	6	18	6
19. ASPMBLNCEON	0~1	1	1	1	1	1	1	1	1	1
20. ASLIMIT	0~1	51	51	51	51	51	51	32	16	51
21. ASLIMITON	0~1	1	1	1	1	1	1	1	1	1
22. ASCORINGON	0~63	1	1	1	1	1	1	1	1	1
23. APBGAIN	0~63	48	26	26	26	26	26	26	26	26
24. APBPEAKFREQ	0~7	7	2	2	2	2	2	2	3	2
25. APBCORING	0~63	8	9	9	9	9	9	9	9	9
26. APBCORINGON	0~1	1	1	1	1	1	1	1	1	1
27. APRGAIN	0~63	48	26	26	26	26	26	26	26	26
28. APRPEAKFREQ	0~7	7	2	2	2	2	2	2	3	2
29. APRCORING	0~63	8	9	9	9	9	9	9	9	9
30. APRCORINGON	0~1	1	1	1	1	1	1	1	1	1
31. AVMPEAKFREQ	0~7	3	3	3	3	3	3	3	2	3
32. AVMLIMITON	0~1	1	1	1	1	1	1	1	1	1
33. AVMHCONTROL	0~63	32	32	32	32	32	32	26	10	32
34. AVMHCTRLON	0~1	0	0	0	0	0	0	1	0	0
35. AVMCORINGON	0~1	1	1	1	1	1	1	1	0	1

Setting item	Variable range	Initial setting value								
		Text 2 screen / Multi 2 screen / Multi 12 screen								
		RF		External (Composite / S)		External (Component)				External (RGB)
		625i	525i	625i	525i	625i	525i	625p / 525p	12 screen	
1. ASLGAIN	0~63	24	24	24	24	24	24	14	24	24
2. ASLVHGAIN	0~63	8	8	8	8	8	8	0	8	8
3. ASLHGAIN	0~63	21	21	26	26	26	26	18	26	26
4. ASLVPEAKFREQ	0~3	1	1	1	1	1	1	1	1	1
5. ASLHPEAKFREQ	0~7	1	1	1	1	1	1	1	1	1
6. ASLEDGECTRL	0~63	37	37	37	37	37	37	18	37	37
7. ASLEDGECTRLON	0~1	1	1	1	1	1	1	1	1	1
8. ASLCORINGON	0~1	1	1	1	1	1	1	1	1	1
9. ASLENHACEON	0~1	1	1	1	1	1	1	1	1	1
10. ASVPEAKFREQ	0~3	2	2	2	2	2	2	3	2	2
11. ASHPEAKFREQ	0~7	4	4	4	4	4	4	2	4	4
12. ASYLCONTROL	0~63	32	32	32	35	35	35	32	32	32
13. ASYLCTRLON	0~1	1	1	1	1	1	1	1	1	1
14. ASYHCONTROL	0~63	63	63	63	63	63	63	63	63	63
15. ASYHCTRLON	0~1	1	1	1	1	1	1	1	1	1
16. ASCCONTROL	0~63	7	7	16	16	7	7	23	7	7
17. ASENHANCEON	0~1	----	----	----	----	----	----	----	----	----
18. ASPMBALANCE	0~63	1	1	6	6	6	6	6	18	6
19. ASPMBLNCEON	0~1	1	1	1	1	1	1	1	1	1
20. ASLIMIT	0~1	51	51	51	51	51	51	32	16	51
21. ASLIMITON	0~1	1	1	1	1	1	1	1	1	1
22. ASCORINGON	0~63	1	1	1	1	1	1	1	1	1
23. APBGAIN	0~63	48	26	26	26	26	26	26	26	26
24. APBPEAKFREQ	0~7	7	2	2	2	2	2	2	3	2
25. APBCORING	0~63	8	9	9	9	9	9	9	9	9
26. APBCORINGON	0~1	1	1	1	1	1	1	1	1	1
27. APRGAIN	0~63	48	26	26	26	26	26	26	26	26
28. APRPEAKFREQ	0~7	7	2	2	2	2	2	2	3	2
29. APRCORING	0~63	8	9	9	9	9	9	9	9	9
30. APRCORINGON	0~1	1	1	1	1	1	1	1	1	1
31. AVMPEAKFREQ	0~7	3	3	3	3	3	3	3	2	3
32. AVMLIMITON	0~1	1	1	1	1	1	1	1	1	1
33. AVMHCONTROL	0~63	32	32	32	32	32	32	26	10	32
34. AVMHCTRLON	0~1	0	0	0	0	0	0	1	0	0
35. AVMCORINGON	0~1	1	1	1	1	1	1	1	0	1

Setting item	Variable range	Initial setting value							
		Single screen	When main screen input is other than RGB, 625p and 525p						
			Multi 2 screen (Sub screen)						
			RF		External (Composite / S)		External (Component)		External (RGB)
			625i	525i	625i	525i	625i	525i	
36. BSLGAIN	0~63	24	24	24	24	24	24	24	24
37. BSLVHGAIN	0~63	8	8	8	8	8	8	8	8
38. BSLHGAIN	0~63	21	21	21	26	26	26	26	26
39. BSLVPEAKFREQ	0~3	1	1	1	1	1	1	1	1
40. BSLHPEAKFREQ	0~7	1	1	1	1	1	1	1	1
41. BSLEDGECTRL	0~63	37	37	37	37	37	37	37	37
42. BSLEDGECTRLON	0~1	1	1	1	1	1	1	1	1
43. BSLCORINGON	0~1	1	1	1	1	1	1	1	1
44. BSLENHACEON	0~1	1	1	1	1	1	1	1	1
45. BSVPEAKFREQ	0~3	2	2	2	2	2	2	2	2
46. BSHPEAKFREQ	0~7	4	4	4	4	4	4	4	4
47. BSYLCONTROL	0~63	32	32	32	35	35	35	35	32
48. BSYLCTRLON	0~1	1	1	1	1	1	1	1	1
49. BSYHCONTROL	0~63	63	63	63	63	63	63	63	63
50. BSYHCTRLON	0~1	1	1	1	1	1	1	1	1
51. BSCCONTROL	0~63	7	7	7	16	16	7	7	7
52. BSENHANCEON	0~1	1	1	1	1	1	1	1	1
53. BSPMBALANCE	0~63	1	1	1	6	6	6	6	6
54. BSPMBLNCEON	0~1	1	1	1	1	1	1	1	1
55. BSLIMIT	0~1	51	51	51	51	51	51	51	51
56. BSLIMITON	0~1	1	1	1	1	1	1	1	1
57. BSCORINGON	0~1	1	1	1	1	1	1	1	1
58. BPBGAIN	0~63	48	26	26	26	26	26	26	26
59. BPBPEAKFREQ	0~7	7	2	2	2	2	2	2	2
60. BPBCORING	0~63	8	9	9	9	9	9	9	9
61. BPBCORINGON	0~1	1	1	1	1	1	1	1	1
62. BPRGAIN	0~63	48	26	26	26	26	26	26	26
63. BPRPEAKFREQ	0~7	7	2	2	2	2	2	2	2
64. BPRCORING	0~63	8	9	9	9	9	9	9	9
65. BPRCORINGON	0~1	1	1	1	1	1	1	1	1
66. BVMPEAKFREQ	0~7	3	3	3	3	3	3	3	3
67. BVMLIMITON	0~1	1	1	1	1	1	1	1	1
68. BVMHCONTROL	0~63	32	32	32	32	32	32	32	32
69. BVMHCTRLON	0~1	0	0	0	0	0	0	0	0
70. BVMCORINGON	0~1	1	1	1	1	1	1	1	1

Setting item	Variable range	Initial setting value							
		When main screen input is one of RGB, 625p or 525p							
		Multi 2 screen (Sub screen)							12 screen
		RF		External (Composite / S)		External (Component)		External (RGB)	
		625i	525i	625i	525i	625i	525i		
36. BSLGAIN	0~63	24	24	24	24	24	24	24	24
37. BSLVHGAIN	0~63	8	8	8	8	8	8	8	8
38. BSLHGAIN	0~63	21	21	26	26	26	26	26	26
39. BSLVPEAKFREQ	0~3	1	1	1	1	1	1	1	1
40. BSLHPEAKFREQ	0~7	1	1	1	1	1	1	1	1
41. BSLEDGECTRL	0~63	37	37	37	37	37	37	37	37
42. BSLEDGECTRLON	0~1	1	1	1	1	1	1	1	1
43. BSLCORINGON	0~1	1	1	1	1	1	1	1	1
44. BSLENHACEON	0~1	1	1	1	1	1	1	1	1
45. BSVPEAKFREQ	0~3	2	2	2	2	2	2	2	2
46. BSHPEAKFREQ	0~7	4	4	4	4	4	4	4	4
47. BSYLCONTROL	0~63	32	32	35	35	35	35	32	35
48. BSYLCTRLON	0~1	1	1	1	1	1	1	1	1
49. BSYHCONTROL	0~63	63	63	63	63	63	63	63	63
50. BSYHCTRLON	0~1	1	1	1	1	1	1	1	1
51. BSCCONTROL	0~63	7	7	16	16	7	7	7	7
52. BSENHANCEON	0~1	1	1	1	1	1	1	1	1
53. BSPMBALANCE	0~63	1	1	6	6	6	6	6	10
54. BSPMBLNCEON	0~1	1	1	1	1	1	1	1	1
55. BSLIMIT	0~1	51	51	51	51	51	51	51	51
56. BSLIMITON	0~1	1	1	1	1	1	1	1	1
57. BSCORINGON	0~1	1	1	1	1	1	1	1	1
58. BPBGAIN	0~63	26	26	26	26	26	26	26	26
59. BPBPEAKFREQ	0~7	2	2	2	2	2	2	2	2
60. BPBCORING	0~63	9	9	9	9	9	9	9	9
61. BPBCORINGON	0~1	1	1	1	1	1	1	1	1
62. BPRGAIN	0~63	26	26	26	26	26	26	26	26
63. BPRPEAKFREQ	0~7	2	2	2	2	2	2	2	2
64. BPRCORING	0~63	9	9	9	9	9	9	9	9
65. BPRCORINGON	0~1	1	1	1	1	1	1	1	1
66. BVMPEAKFREQ	0~7	3	3	3	3	3	3	3	3
67. BVMLIMITON	0~1	1	1	1	1	1	1	1	1
68. BVMHCONTROL	0~63	32	32	32	32	32	32	32	32
69. BVMHCTRLON	0~1	0	0	0	0	0	0	0	0
70. BVMCORINGON	0~1	1	1	1	1	1	1	1	1

4.8 ADJUSTMENT PROCEDURE

4.8.1 CHECK ITEM

Item	Measuring instrument	Test point	Adjustment part	Description
B1 POWER SUPPLY check	Signal generator DC voltmeter Remote control unit	S1 Connector TP-91 TP-E [MAIN PWB]	[2. V/C] 1. CUT_OF_R SCREEN VR [In FBT]	(1) Receive the black and white signal (color off). (2) Connect the DC voltmeter to TP-91 (S1 connector 5 pin) and TP-E (S1 connector 1 pin). (3) Select 2. V/C. (4) Select < 1. CUT_OF_R >. (5) Show one horizontal line with the [YELLOW (FREEZE/SWAP)] key. (6) Turn the SCREEN VR counterclockwise to display whole black screen. (7) Make sure that the voltage is DC148V (±2V). (8) Readjust the SCREEN VR to appear the horizontal line faitly, and cancel the horizontal line by pressing the [YELLOW (FREEZE/SWAP)] key.

4.8.2 HIGH VOLTAGE

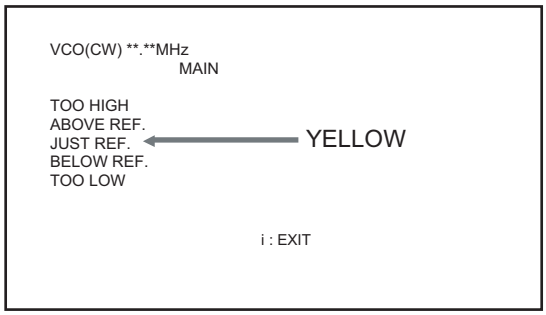
Item	Measuring instrument	Test point	Adjustment part	Description
HIGH VOLTAGE	Signal generator HV voltmeter Remote control unit	CRT anode	[2. V/C] 1. CUT_OF_R EHT ADJ VR (R2528) [EHT PWB] SCREEN VR [In FBT]	(1) Receive the black and white signal (color off). (2) Connect the HV voltmeter to CRT anode and chassis GND. (3) Select 2. V/C. (4) Select < 1. CUT_OF_R >. (5) Show one horizontal line with the [YELLOW (FREEZE/SWAP)] key. (6) Turn the SCREEN VR counterclockwise to display whole black screen. (7) Adjust EHT ADJ VR so that the voltage become 31kV (±0.2V). (8) Readjust the SCREEN VR to appear the horizontal line faitly, and cancel the horizontal line by pressing the [YELLOW (FREEZE/SWAP)] key.

4.8.3 HORIZONTAL FREQUENCY

Item	Measuring instrument	Test point	Adjustment part	Description
HORIZONTAL FREQUENCY	Remote control unit		[4. DEF] 1. FREE-RUN	(1) Receive any broadcast. (2) Select 4. DEF. (3) Confirm that when you enter to the 4. DEF, the screen automatically show the FREE-RUN screen. And the picture run up or down. (4) Adjust the < 1. FREE-RUN > to stop the picture. But the picture does not stop completely. (5) Press the [MENU] key to memorize the adjustment data.

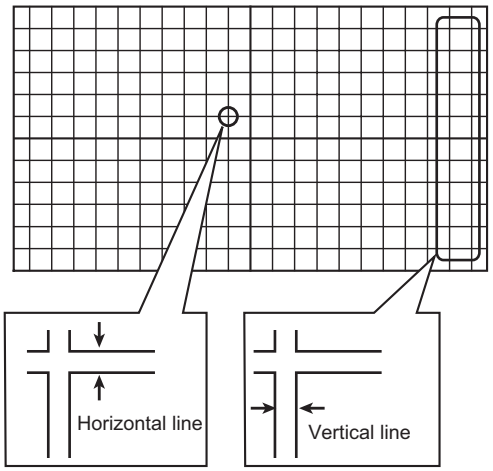
4.8.4 TUNER / IF CIRCUIT

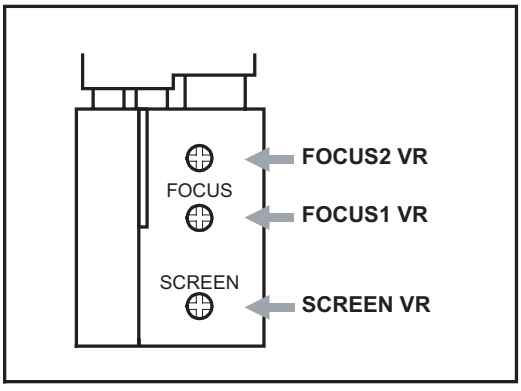
Item	Measuring instrument	Test point	Adjustment part	Description
IF VCO check	Remote control unit		[1. IF] 1. VCO	• It must not adjust without inputting the RF signal. (1) Receive the broadcast. (2) Select 1. IF. (3) Select < 1. VCO >. (4) Confirm that the letter of [JUST REF.] displayed in yellow.



4.8.5 FOCUS

Item	Measuring instrument	Test point	Adjustment part	Description
FOCUS	Signal generator		FOCUS1 VR FOCUS2 VR [In FBT]	(1) Receive the crosshatch signal. (2) Select the ZOOM to FULL. (3) While watching to the screen, adjust the FOCUS2 VR to the horizontal lines will be clear and in fine detail at center of screen. (4) Then adjust the FOCUS1 VR to the vertical lines will be clear and in fine detail at the circumference part of screen. (5) Make sure that the picture is in focus even when the screen gets darkened.





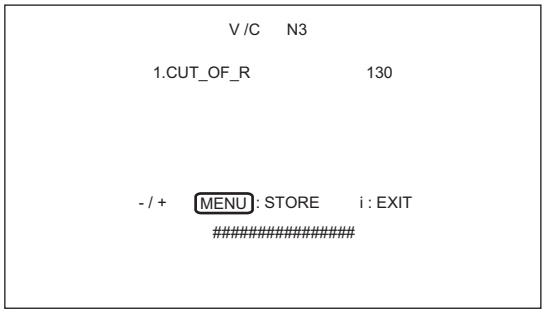
4.8.6 VSM PRESET

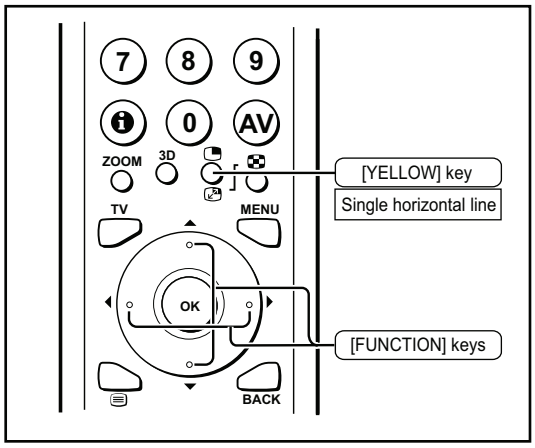
Item	Measuring instrument	Test point	Adjustment part	Description
VSM PRESET setting	Remote control unit		[5. VSM PRESET] 1. CONT 2. BRIGHT 3. SHARP 4. COLOUR 5. TINT 6. WDR R 7. WDR G 8. WDR B	(1) Select 5. VSM PRESET (2) Set the PICTURE MODE to "BRIGHT". (3) Select < 1. CONT >. (4) Set the initial setting value of VSM PRESET, as shown in the table given below. (5) Press the [MENU] key to memorize the setting value. (6) Select < 2. BRIGHT > to < 8. WDR B > in turn. Check and set the values. (7) Respectively select the "STANDARD" to "WARM", and make similar adjustment as same step as avobe. **NOTE:** Refer to OPERATING INSTRUCTIONS to switch the PICTURE MODE.

	PICTURE MODE			COLOUR TEMP		
	BRIGHT	STANDARD	SOFT	COOL	NORMAL	WARM
CONT	+16	+2	-8	-----	-----	-----
BRIGHT	0	0	0	-----	-----	-----
SHARP	0	0	-2	-----	-----	-----
COLOUR	0	0	-2	-----	-----	-----
TINT	0	0	0	-----	-----	-----
WDR R	-----	-----	-----	-6	0	+11
WDR G	-----	-----	-----	0	0	0
WDR B	-----	-----	-----	+12	0	0

4.8.7 VIDEO CIRCUIT

Item	Measuring instrument	Test point	Adjustment part	Description
WHITE BALANCE (LOW LIGHT)	Signal generator Remote control unit		[2. V/C] 1. CUT_OF_R 2. CUT_OF_G 3. CUT_OF_B SCREEN VR [In FBT]	(1) Receive the black and white signal (color off). (2) Select the 2. V/C. (3) Set the initial setting value of < 1.CUT_OF_R >, < 2. CUT_OF_G > and < 3. CUT_OF_B >. (4) Display the single horizontal line with the [YELLOW (FREEZE/SWAP)] key. (5) Turn the SCREEN VR all the way to the left. (6) Turn the SCREEN VR gradually to the right from the left until either one of the red, blue or green color apperares faintly. (7) Adjust the two colors CUTOFF vlues which did not appear until the single horizontal line that is dsiplayed become white with the < 1.CUT_OF_R >, < 2. CUT_OF_G > or < 3. CUT_OF_B >. (8) Press the [MENU] key to memorize the adjustment value. (9) Turn the SCREEN VR until the single horizontal line is displayed faitly. (10) Press the [YELLOW (FREEZE/SWAP)] key to cancel the single horizontal line mode. (11) Confirm that whether the color ingredient of R, G or B is visible to the black component, which shines white slightly. (12) Input the black and white of 625p signal to the component input terminal. (13) Confirm that there is no problem on the low light adjustment condition. If it is too bad, adjust the < 1. CUT_OF_R > to < 3. CUT_OF_B > as same step as avobe mentioned.





Setting item	Initial setting value
1. CUT_OF_R	130
2. CUT_OF_G	130
3. CUT_OF_B	130

<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>WHITE BALANCE (HIGH LIGHT)</td><td>Signal generator

Remote control unit</td><td></td><td>[2. V/C]
4. DRIVE_R
5. DRIVE_G
6. DRIVE_B</td><td rowspan="3">(1) Receive the black and white signal (color off).
(2) Select the 2. V/C.
(3) Set the initial setting value of < 4. DRIVE_R >, < 5. DRIVE_G > and < 6. DRIVE_B >.
(4) Adjust the high light values until screen becomes white with the < 4. DRIVE_R >, < 5. DRIVE_G > and < 6. DRIVE_B >.
(5) Press the [MENU] key to memorize the adjustment value.</td></tr>
<tr><td colspan="4">V /C N3
1.DRIVE_R 64
- / + MENU : STORE i : EXIT
################

<table><tr><th>Setting item</th><th>Initial setting value</th></tr><tr><td>4. DRIVE_R</td><td>64</td></tr><tr><td>5. DRIVE_G</td><td>64</td></tr><tr><td>6. DRIVE_B</td><td>64</td></tr></table></td></tr>
<tr><td>SUB BRIGHT</td><td>Remote control unit</td><td></td><td>[2. V/C]
7. BRIGHT</td></tr>
<tr><td colspan="4"><table><tr><th>Setting item</th><th>Initial setting value</th></tr><tr><td>7. BRIGHT</td><td>130</td></tr></table></td><td>(1) Receive the broadcast.
(2) Select 2. V/C.
(3) Set the initial setting value of the < 7. BRIGHT >.
(4) If the brightness is not the best with the initial setting value, make fine adjustment of the < 7. BRIGHT > until you get the optimum brightness.
(5) Press the [MENU] key to memorize the adjustment values.</td></tr>
<tr><td>SUB CONTRAST</td><td>Remote control unit</td><td></td><td>[2. V/C]
8. CONT</td></tr>
<tr><td colspan="4"><table><tr><th>Setting item</th><th>Initial setting value</th></tr><tr><td>8. CONT</td><td>52</td></tr></table></td><td>(1) Receive the broadcast.
(2) Select 2. V/C.
(3) Set the initial setting value of the < 8. CONT >.
(4) If the contrast is not the best with the initial setting value, make fine adjustment of the < 8. CONT > until you get the optimum contrast.
(5) Press the [MENU] key to memorize the adjustment values.</td></tr>
</table>

<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>SUB COLOUR(1)</td><td>Signal generator

Remote control unit</td><td></td><td>[2. V/C]
9. COLOUR</td><td rowspan="2">[Method of adjustment without measuring instruments]

PAL COLOUR
(1) Receive PAL broadcast.
(2) Select 2. V/C.
(3) Set the initial setting value for < 9. COLOUR >.
(4) If the colour is not the best with the initial set value, make fine adjustment until you get the best colour.
(5) Press the [MENU] key and memorize the adjustment value.

SECAM COLOUR
(1) Receive SECAM broadcast.
(2) Select 2. V/C.
(3) Set the initial setting value for < 9. COLOUR >.
(4) If the colour is not the best with the initial set value, make fine adjustment until you get the best colour.
(5) Press the [MENU] key and memorize the adjustment value.

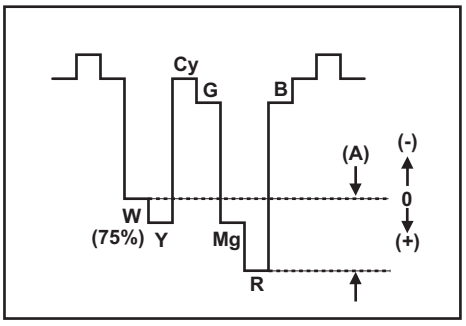
NTSC 3.58 COLOUR
(1) Input NTSC 3.58MHz COMPOSITE VIDEO signal.
(2) Select 2. V/C.
(3) Set the initial setting value for < 9. COLOUR >.
(4) If the colour is not the best with the initial set value, make fine adjustment until you get the best colour.
(5) Press the [MENU] key and memorize the adjustment value.</td></tr>
<tr><td colspan="4"><table>
<tr><th>Colour system</th><th>Initial setting value</th></tr>
<tr><td>PAL</td><td>80</td></tr>
<tr><td>SECAM</td><td>55</td></tr>
<tr><td>NTSC 3.58</td><td>63</td></tr>
</table></td></tr>
<tr><td>SUB COLOUR(2)</td><td>Signal generator

Oscilloscope

Remote control unit</td><td>TP-47R
TP-E
[CRT SOCKET PWB]</td><td>[2. V/C]
9. COLOUR</td><td rowspan="2">[Method of adjustment using measuring instruments]

PAL COLOUR
(1) Receive PAL full field colour bar signal (75% white).
(2) Select 2. V/C.
(3) Set the initial setting value of < 9. COLOUR >.
(4) Connect the oscilloscope between TP-47R and TP-E at the CRT SOCKET PWB.
(5) Adjust < 9. COLOUR > and bring the value of (A) in the illustration to the values as shown in the table (Voltage difference between white (W) and red (R)).
(6) Press the [MENU] key and memorize the adjustment value.

SECAM COLOUR
(1) Receive SECAM colour bar signal (75% white).
(2) Select 2. V/C.
(3) Set the initial setting value of < 9. COLOUR >.
(4) Connect the oscilloscope between TP-47R and TP-E at the CRT SOCKET PWB.
(5) Adjust < 9. COLOUR > and bring the value of (A) in the illustration to the values as shown in the table (Voltage difference between white (W) and red (R)).
(6) Press the [MENU] key and memorize the adjustment value.

NTSC 3.58 COLOUR
(1) Input NTSC3.58MHz full field colour bar signal (75% white).
(2) Select 2. V/C.
(3) Set the initial setting value for < 9. COLOUR >.
(4) Connect the oscilloscope between TP-47R and TP-E at the CRT SOCKET PWB.
(5) Adjust < 9. COLOUR > and bring the value of (A) in the illustration to the values as shown in the table (Voltage difference between white (W) and red (R)).
(6) Press the [MENU] key and memorize the adjustment value.</td></tr>
<tr><td colspan="4"> 

<table>
<tr><th>Colour system</th><th>Adjustment value</th></tr>
<tr><td>PAL</td><td>+5V</td></tr>
<tr><td>SECAM</td><td>0V</td></tr>
<tr><td>NTSC 3.58</td><td>-2V</td></tr>
</table></td></tr>
</table>

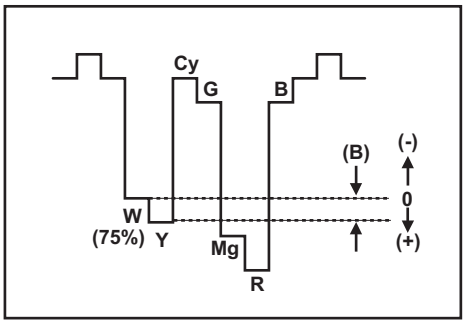
<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>SUB TINT(1)</td><td>Signal generator

Remote control unit</td><td></td><td>[2. V/C]
10. TINT</td><td rowspan="2">[Method of adjustment without measuring instruments]

NTSC 3.58 TINT
(1) Input NTSC3.58MHz full field colour bar signal (75% white).
(2) Select 2. V/C.
(3) Set the initial setting value of < 10. TINT >.
(4) If the tint is not the best with the initial set value, make fine adjustment until you get the best hue.
(5) Press the [MENU] key and memorize the adjustment value.</td></tr>
<tr><td colspan="4"><table><tr><th>Setting item</th><th>Initial setting value</th></tr><tr><td>10.TINT</td><td>63</td></tr></table></td></tr>
<tr><td>SUB TINT(2)</td><td>Signal generator

Oscilloscope

Remote control unit</td><td>TP-47R
TP-E
[CRT SOCKET PWB]</td><td>[2. V/C]
10. TINT</td><td rowspan="2">[Method of adjustment using measuring instruments]

NTSC 3.58 TINT
(1) Input NTSC3.58MHz full field colour bar signal (75% white).
(2) Select 2. V/C.
(3) Set the initial setting value of < 10. TINT >.
(4) Connect the oscilloscope between TP-47R and TP-E at the CRT SOCKET PWB.
(5) Adjust < 10. TINT > and bring the value of (B) in the illustration to the values as shown in the table (Voltage difference between white (W) and yellow (Y)).
(6) Press the [MENU] key and memorize the adjustment value.</td></tr>
<tr><td colspan="4"> 

<table><tr><th>Setting item</th><th>Adjustment value</th></tr><tr><td>10.TINT</td><td>+1V</td></tr></table></td></tr>
</table>

4.8.8 DEFLECTION CIRCUIT

(1) The deflection adjustment using the remote control unit is made on the basis of the initial setting values. The setting values which adjust the screen to the optimum condition can be different from the initial setting values.

(2) There are several kinds of adjustment modes with the vertical frequency (Vertical frequency : PAL-50Hz, NTSC-60Hz).

a) At first, the adjustment in PAL-50Hz, 900i mode should be done. Then the adjustment for the other vertical frequency mode is corrected in the respective value at the same time.

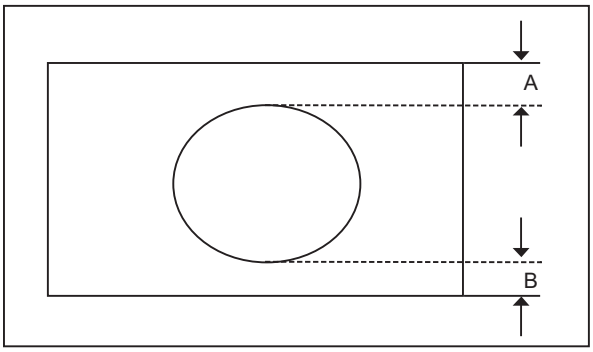
b) However, if the picture quality has not been optimized, adjust each vertical frequency mode again, respectively.

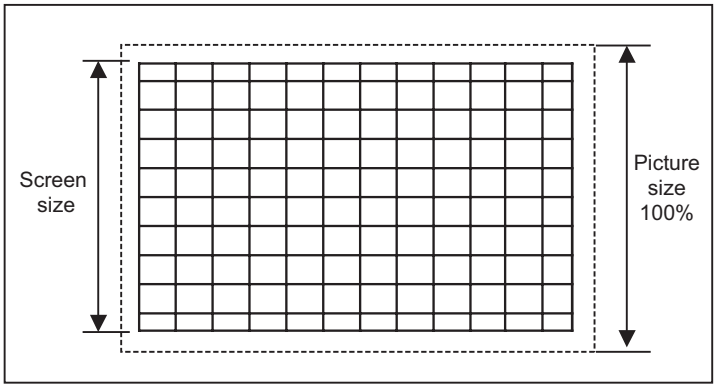
c) If adjustment in PAL-50Hz each vertical frequency mode has been done in very high accuracy, the adjustment for the same vertical frequency mode in NTSC-60Hz mode is corrected in the respective value. Adjustment is completed at this time.

d) If the picture quality in NTSC-60Hz has not been optimized, adjust each zoom mode again in NTSC-60Hz, respectively. In this case, only NTSC-60Hz each zoom mode is corrected.

(3) Deflection adjustment should surely carry out by setting zoom mode to FULL. Since a deflection setup of those other than FULL mode is carried out by SERVICE MENU 8. IP setting, adjustment in zoom modes other than FULL mode is unnecessary.

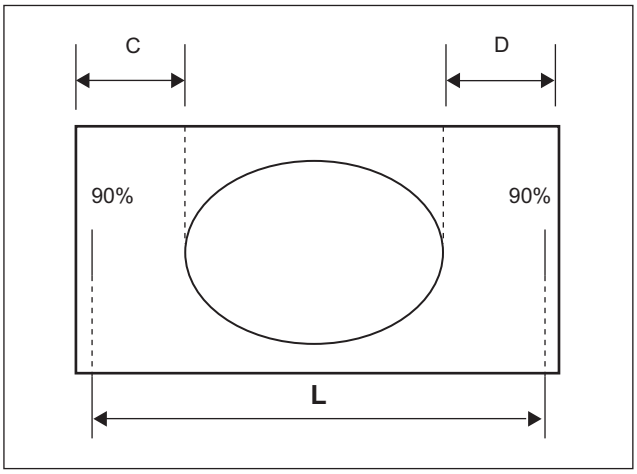
<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>V. POSITION</td><td>Signal generator

Remote control unit</td><td></td><td>[4. DEF]
2. V-SHIFT</td><td rowspan="2">(1) Select the ZOOM mode to FULL.
(2) Receive the circle pattern signal.
(3) Select 4. DEF.
(4) Set the initial setting value of < 2. V-SHIFT >.
(5) Adjust < 2. V-SHIFT > to become A=B as shown in the figure.
(6) Press the [MENU] key to memorize the adjustment value.</td></tr>
<tr><td colspan="4"> 
</td></tr>
<tr><td>V. SIZE</td><td>Signal generator

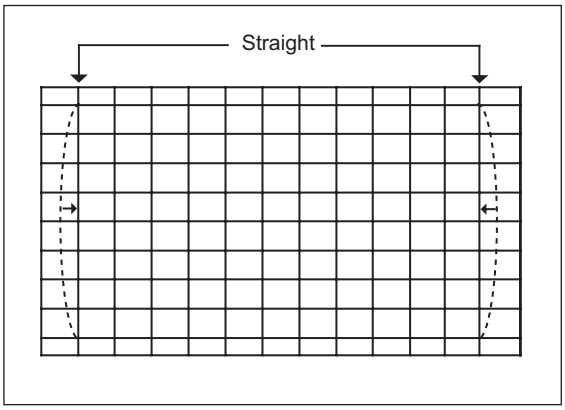
Remote control unit</td><td></td><td>[4. DEF]
3. V-SIZE</td><td rowspan="2">(1) Receive the crosshatch signal.
(2) Select 4. DEF.
(3) Set the initial setting value of < 3. V-SIZE >.
(4) Adjust < 3. V-SIZE > to become the vertical screen size given below table.
(5) Press the [MENU] key to memorize the adjustment value.</td></tr>
<tr><td colspan="4"> 

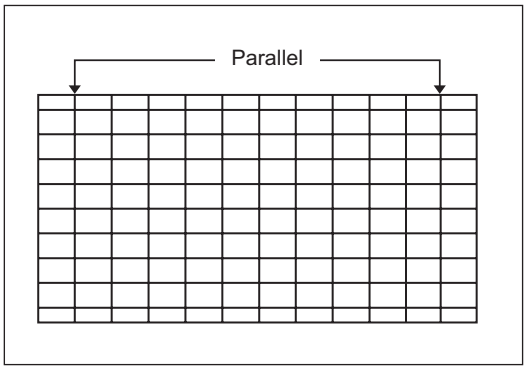
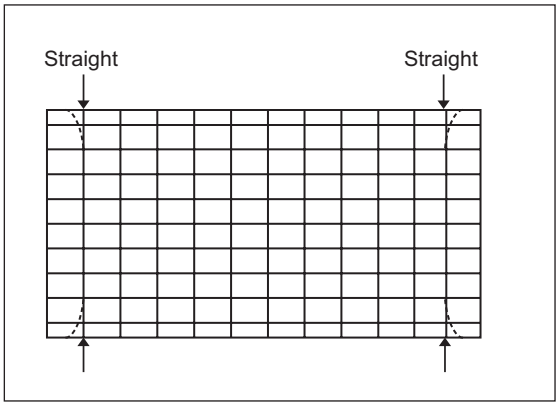
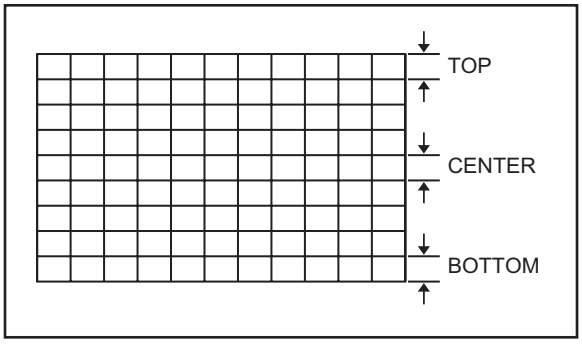
<table>
<tr><th>Setting position</th><th>900i</th><th>1125i</th><th>1350i</th><th>602p</th></tr>
<tr><td>SCREEN TOP</td><td>92%</td><td>92%</td><td>92%</td><td>92%</td></tr>
<tr><td>SCREEN BOTTOM</td><td>92%</td><td>92%</td><td>92%</td><td>92%</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>H. POSITION</td><td>Signal generator

Remote control unit</td><td></td><td>[4. DEF]
4. H-CENT</td><td rowspan="2">(1) Receive the circle pattern signal.
(2) Select 4. DEF.
(3) Set the initial setting value of < 4. H-CENT >.
(4) Adjust < 4. H-CENT > to become C=D as shown in left figure.
(5) Press the [MENU] key to memorize the adjustment value.</td></tr>
<tr><td colspan="4"> 
</td></tr>
<tr><td>H. SIZE</td><td>Signal generator

Remote control unit</td><td></td><td>[4. DEF]
5. H-SIZE</td><td rowspan="2">(1) Receive the circle pattern signal.
(2) Select 4. DEF.
(3) Set the initial setting value of < 5. H-SIZE >.
(4) Adjust < 5. H-SIZE > to become the horizontal screen size is in the table given left.
(5) Press the [MENU] key to memorize the adjustment value.</td></tr>
<tr><td colspan="4"><table>
<tr><th>Setting item</th><th>900i</th><th>1125i</th><th>1350i</th><th>602p</th></tr>
<tr><td>5. H-SIZE</td><td>92%</td><td>92%</td><td>92%</td><td>92%</td></tr>
</table></td></tr>
<tr><td>SIDE PIN</td><td>Signal generator

Remote control unit</td><td></td><td>[4. DEF]
7. EW-PIN</td><td rowspan="2">(1) Receive the circle pattern signal.
(2) Select 4. DEF.
(3) Set the initial setting value of < 7. EW-PIN >.
(4) Adjust < 7. EW-PIN > so that second vertical lines at the right and left edges of the screen become straight. Also make third vertical lines become straight.
(5) Press the [MENU] key to memorize the adjustment value.</td></tr>
<tr><td colspan="4"> 
</td></tr>
</table>

Item	Measuring instrument	Test point	Adjustment part	Description
TRAPEZIUM	Signal generator Remote control unit		[4. DEF] 6. TRAPEZ	(1) Receive the crosshatch signal. (2) Select 4. DEF. (3) Set the initial setting value of < 7. TRAPEZ >. (4) Adjust < 7. TRAPEZ > to become the vertical lines at the right and left edges of the screen parallel. (5) Press the [MENU] key to memorize the adjustment value.
				
CORNER PIN	Signal generator Remote control unit		[4. DEF] 8. COR-UP 9. COR-LOW	(1) Receive the crosshatch signal. (2) Select 4. DEF. (3) Set the initial setting value of < 8. COR-UP >. (4) Adjust < 8. COR-UP > to become the vertical line at the upper corner straight. (5) Set the initial setting value of < 9. COR-LOW >. (6) Adjust < 9. COR-LOW > to become the vertical line at the lower corner straight. (7) Press the [MENU] key to memorize the adjustment value.
				
V. LINEARITY	Signal generator Remote control unit		[4. DEF] 10. V.S-COR 11. V-LIN	Should not adjustment except for in case of under the condition that remarkably bad about vertical linearity. (1) Receive the crosshatch signal. (2) Select 4. DEF. (3) Set the initial setting value of < 10. V.S-COR >. (4) Adjust the < 10. V.S-COR > to the all square in the crosshatch screen become true square. (5) Set the initial setting value of < 11.V-LIN >. (6) Adjust the < 11. V-LIN > to the all vertical lines become straight. (7) Press the [MENU] key to memorize the adjustment value.
				

4.8.9 SUB SCREEN ADJUSTMENT

<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>SUB SCREEN CONTRAST</td><td>Signal generator

Remote control unit</td><td></td><td>[2. V/C]
11. TWN_CONT</td><td>(1) Set the screen to the multi (twin) mode.
(2) Receive the black and white signal (color off) to both right and left screen.
(3) Select 2. V/C.
(4) Set the initial setting value of < 11. TWN_CONT >.
(5) If the contrast of both screen are not the best with the initial setting value, make fine adjustment of the < 11. TWN_CONT > until you get the optimum contrast.
(6) Press the [MENU] key to memorize the adjustment values.</td></tr>
<tr><td>SUB SCREEN COLOUR & TINT</td><td>Signal generator

Remote control unit</td><td>TP-47R
TP-E
[CRT SOCKET PWB]</td><td>[2. V/C]
12. TWN_COL
13. TWN_TNT</td><td>PAL COLOUR
(1) Set the screen to the multi (twin) mode.
(2) Receive PAL full field colour bar signal (75% white) to the sub screen.
(3) Select 2. V/C.
(4) Set the initial setting value of < 12. TWN_COL >.
(5) Connect the oscilloscope between TP-47R and TP-E at the CRT SOCKET PWB.
(6) Adjust < 12. TWN_COL > so that the voltage difference between white and red become +5V.
(7) Press the [MENU] key to memorize the adjustment value.

SECAM COLOUR [Except model for UK]
(1) Set the screen to the multi (twin) mode.
(2) Receive SECAM colour bar signal (75% white) to the sub screen.
(3) Select 2. V/C.
(4) Set the initial setting value of < 12. TWN_COL >.
(5) Connect the oscilloscope between TP-47R and TP-E at the CRT SOCKET PWB.
(6) Adjust < 12. TWN_COL > so that the voltage difference between white and red become 0V.
(7) Press the [MENU] key to memorize the adjustment value.

NTSC COLOUR
(1) Set the screen to the multi (twin) mode.
(2) Input NTSC3.58 full field colour bar signal (75% white) from the EXT terminal to sub screen.
(3) Select 2. V/C.
(4) Set the initial setting value of < 12. TWN_COL >.
(5) Connect the oscilloscope between TP-47R and TP-E at the CRT SOCKET PWB.
(6) Adjust < 12. TWN_COL > so that the voltage difference between white and red become -2V.
(7) Press the [MENU] key to memorize the adjustment value.

NTSC TINT
(1) Set the screen to the multi (twin) mode.
(2) Input NTSC3.58 full field colour bar signal (75% white) from the EXT terminal to sub screen.
(3) Select 2. V/C.
(4) Set the initial setting value of < 13. TWN_TNT >.
(5) Connect the oscilloscope between TP-47R and TP-E at the CRT SOCKET PWB.
(6) Adjust < 13. TWN_TNT > so that the voltage difference between white and yellow become +1V.
(7) Press the [MENU] key to memorize the adjustment value.</td></tr>
</table>

SUB SCREEN COLOUR

Colour system	Initial setting value
PAL	9
SECAM	9
NTSC 3.58	9

SUB SCREEN COLOUR ADJUSTMENT VALUE[V]

Colour system	Adjustment value
PAL	+5V
SECAM	0V
NTSC 3.58	-2V

SUB SCREEN TINT

Colour system	Initial setting value
NTSC 3.58	35

SUB SCREEN TINT ADJUSTMENT VALUE[V]

Colour system	Adjustment value
NTSC 3.58	+1V

SECTION 5
TROUBLESHOOTING

This service manual does not describe TROUBLESHOOTING.

JVC
VICTOR COMPANY OF JAPAN, LIMITED
AV & MULTIMEDIA COMPANY VIDEO DISPLAY CATEGORY 12, 3-chome, Moriya-cho, kanagawa-ku, Yokohama, kanagawa-prefecture, 221-8528, Japan

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